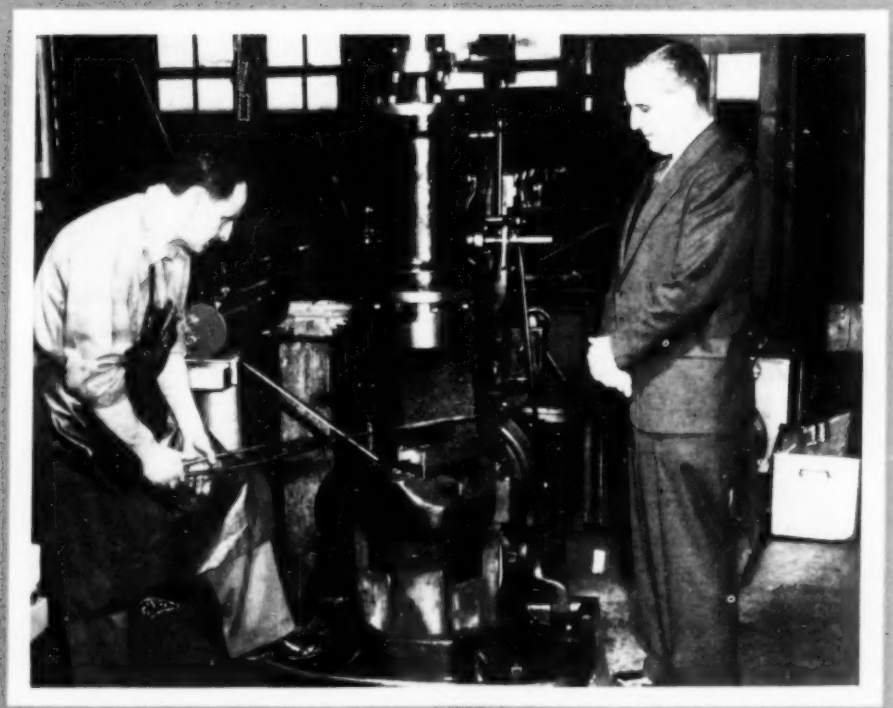
Industrial Arts and Vocational Education

The SHOP TEACHERS' PROFESSIONAL MAGAZINE

SEPTEMBER, 1953 Vol. 42, No. 7



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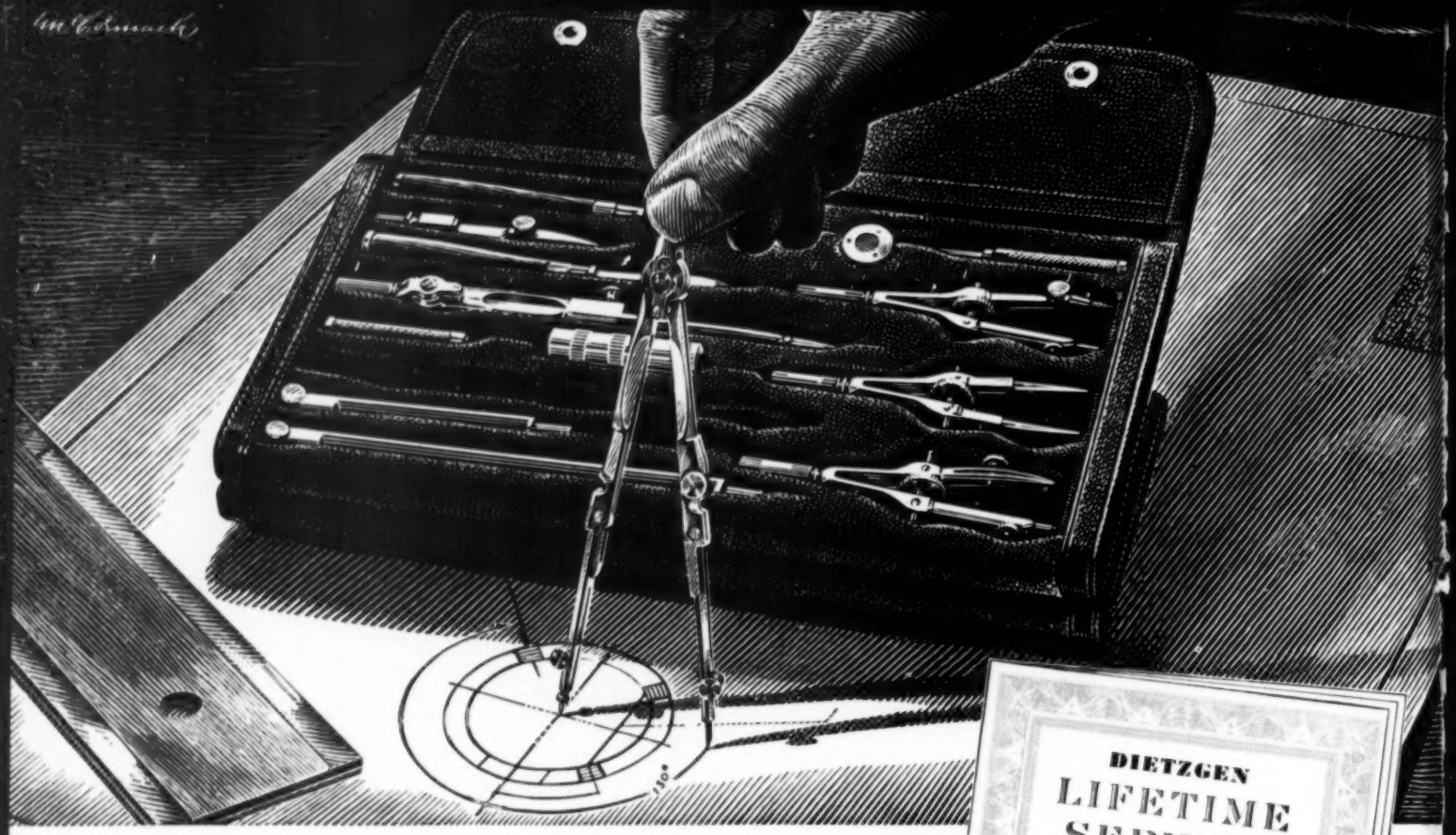

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Every year thousands of youngsters reach the point in their schooling where each is suddenly faced with the requirement of purchasing a set of drawing instruments. When the boy is the son of a technically trained father or when he asks the advice of a conscientious drafting instructor, the problem of selecting the proper drawing instruments is quickly answered. These men know drawing instruments are normally purchased but once in a lifetime, that the make of instruments selected can be either a matter of many years of rewarding satisfaction or of continual regret.

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The original and complete student handbook on the operation and care of metalworking lathes. New revised edition 51 describes latest shop methods and practices. Clearly written in simple, non-technical language. Every student should have a copy. 128 pages—365 illustrations. 50c per copy postpaid. Also published in Spanish, Portuguese and French.

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The operation of the metalworking bench shaper is clearly explained in this 32-page handbook. Many practical job set-ups shown. 25c per copy.

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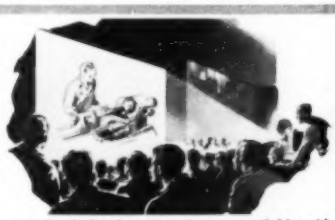
Film No. I Introduces the student to the standard back-geared, screw-cutting lathe by familiarizing him with principal lathe parts, their names, purpose and operation. Showing time, 20 min. 16 mm sound in full color. *Free loan.*



"PLAIN TURNING"
Film No. II Teaches all basic operations in between centers machining. Shows use of calipers and micrometers, drilling center holes, selecting cutter bits, facing, rough and finish turning. Time, 20 min. 16 mm sound, full color. *Free loan.*

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Film No. III Shows grinding of cutter bits for rough and finish turning, cutting off, thread cutting. Also, tool adjustment and action. Time, 20 minutes. 16 mm sound, full color. *Free loan.*

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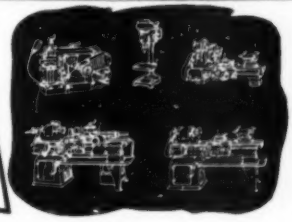
Sample copies of all printed teaching helps will be sent free upon request to school shop instructors and supervisors. Also request loan information on training films.



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SEPTEMBER
1953

VOL. 42 NO. 7

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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This Month's Cover

The picture chosen for the cover of the 1953 School Opening number of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows Dr. John A. Jarvis, dean of industrial education at The Stout Institute, Menomonie, Wis., observing the performance of a student who is working on a trip hammer.

The student shown is Jose Cosio, a Peruvian educator who has attended Stout during the past year. Mr. Cosio will return to Peru to direct the Central Normal School in Lima.

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ASSOCIATION NEWS

Coming Conventions

Aug. 17–21. North Carolina Vocational Association, at North Carolina State College, Raleigh, N. C. Secretary, Murray D. Thornburg, Dept. of Education, Room 432 Education Bldg., Raleigh, N. C.

Aug. 24–26. Arizona Vocational Agriculture Association. Secretary, Harry Boyle, Marana, Ariz.

Sept. 25–26. Ohio Vocational Association at Southern Hotel, Columbus, Ohio. Secretary, Ralph J. Woodin, Ohio State University, Columbus, Ohio.

Oct. 2–3. Four-State Industrial Arts and Vocational Education Conference, at Kansas State Teachers College, Pittsburg, Kans. Chairman, Doyle Kemper, Springfield, Mo.

Oct. 12–15. Future Farmers of America, at Municipal Auditorium, Kansas City, Mo. Secretary, A. W. Tenney, Office of Education, Federal Security Agency, Washington 25, D. C.

Oct. 15–17. Maryland Industrial Education, Division of MSTA, at Hotel Lord Baltimore, Baltimore, Md. Secretary, Milson C. Raver, 5 E. Read St., Baltimore 2, Md.

Oct. 15–17. Maryland Vocational Association, at Lord Baltimore Hotel, Baltimore, Md. Secretary, Milson C. Raver, 5 E. Read St., Baltimore 2, Md.

Oct. 19–23. National Safety Council at Conrad Hilton Hotel, Chicago, Ill. Secretary, R. L. Forney, 425 N. Michigan Ave., Chicago 11, Ill.

Oct. 23. New Mexico Vocational Association, at Albuquerque, N. Mex. Secretary, Miss Evelyn Gose, 4200 E. Roma, Albuquerque, N. Mex.

Oct. 25–29. Adult Education Association of the U.S.A., at Hotel New Yorker, New York City. Secretary, Dr. Fern Long, Cleveland Public Library, Cleveland 14, Ohio.

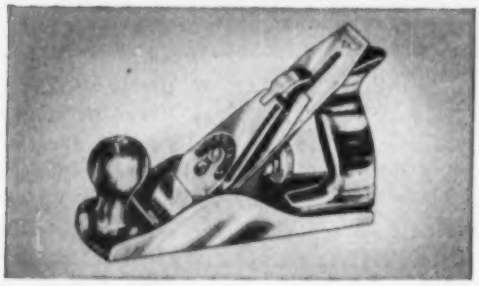
Oct. 29–30. Minnesota Vocational Association, at Hotel Radisson, Minneapolis, Minn. Secretary, A. Donald Beattie, 488 Wabasha St., Shubert Bldg., St. Paul 1, Minn.

Oct. 29–30. Oklahoma Industrial Arts Association, at Capitol Hill Senior High School, Oklahoma City, Okla. Secretary, Cary Hill, A. & M. College, Stillwater, Okla.

Oct. 30. Virginia Vocational Association, at Virginia Education Association, Richmond, Va. Secretary, Richard Almarcde, Suffolk High School, Suffolk, Va.

No. 75 BLOCK PLANE
For working end-grain surfaces. Invaluable, too, for many light jobs cutting with the grain. Short, light, easily controlled.

All Favorites



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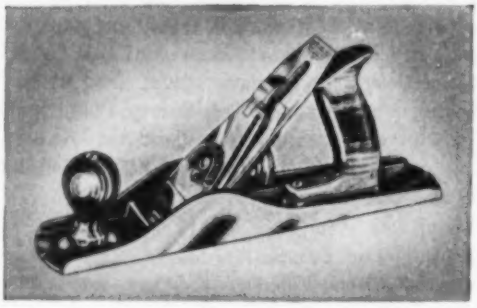
No. 9 SMOOTH PLANE
For finishing large surfaces. Improved grip gives more hand room — better balance, control, comfort.

No. 14 JACK PLANE
For edging and all-around use. Quick, easy depth and side adjustments of irons.



Favorites for years with expert craftsmen — Millers Falls Planes are today better than ever in two important ways.

FIRST: All bench models are now equipped with new, scientifically re-shaped handles. The grip is roomier, more comfortable. That means easier handling, better control, less fatigue.

SECOND: All wood parts are now made of colorful Goncalo hardwood — brilliantly grained for new beauty — incredibly durable to withstand a lifetime of rugged use.

In addition, you still get all the time-tested features that have made Millers Falls Planes world famous for accuracy and performance. Write for full details on Millers Falls better-than-ever line of planes for every purpose.

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FOUNDERS DAY BANQUET — ALPHA FIELD CHAPTER, EPSILON PI TAU

The annual Founder's Day banquet of the Alpha Field Chapter, Epsilon Pi Tau was held on March 27, 1953, at the Central Administrative dining room of the Los Angeles City Schools. Professor Emanuel E. Ericson of Santa Barbara College gave the address of the evening, speaking to the 130 EPT members and their school administrator guests.

25th Anniversary — EPT Founders Day Banquet — Alpha Field Chapter

Left to right: Lyman Goldsmith, co-trustee; Edgar R. Lanning, president; Claude E. Nihart, trustee; E. E. Ericson, speaker; William Hahn, vice-president; and Wayne Wonacott, retiring president.

A feature of the program was the presentation of a Laureate membership to Mr. Hugh Baird, veteran industrial-arts teacher of Franklin High School, Los Angeles. The citation read: "For an eminent career as craftsman, instructor, and teacher educator, and for inspirational teaching which has resulted in outstanding achievement records by his students."

Officers installed at this banquet for the coming year were: president — Edgar R. Lanning, vice-president — William R. Hahn, treasurer — Earl

(Continued on page 6A)

B&D DRILLS give students practical experience in all kinds of drilling: in metal, wood, plastics, masonry. Drive Hole Saws, double as sturdy drill presses in B&D Bench Stands.

B&D SCREW DRIVERS will speed up training projects involving driving all types of fasteners in assembling wood, metal, plastic parts. Accurate, compact, easy to handle.

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B&D BENCH GRINDERS are quality-built for long service in your shop. Train students in tool sharpening, grinding, buffing, burnishing, cleaning operations.

B&D VIBRO-CENTRIC* VALVE SEAT GRINDERS train students to put mirror finishes on all internal combustion engine valve seats in a few seconds. Easy to operate.

B&D VALVE REFACERS are the finest equipment made for training students to grind factory-accurate angles in all types of internal combustion engine valves.

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USING Black & Decker Tools to train your students gives them a head start toward doing better jobs in industry! That's because they'll find B&D Tools wherever they go . . . in factories, small shops and garages alike. And working with the same tools they learned to use in school gives them added confidence when they make the switch from school to shop.

What's more, you'll find it *easier* to *teach* with B&D Tools. They're husky, dependable, easy to handle, safe to use—all qualities that are hard to beat when you're working with green hands. And B&D Tools *cost you less in the long run*, because they outlast cheaper types! See your nearby Black & Decker Distributor for complete information on over 100 Tools and hundreds of accessories. Write for free catalog to: THE BLACK & DECKER MFG. CO., 616 Pennsylvania Ave., Towson 4, Md.

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ASSOCIATION NEWS

(Continued from page 4A)

G. Wilbert, George Cole, executive secretary, remains in his present office.

ADULT VOCATIONAL-INDUSTRIAL CONFERENCE

A conference for teachers and directors of adult vocational industrial classes and programs was held July 15 and 16, 1953, at the State Teachers College, Oswego, N. Y. The meetings were planned by the college in co-operation with the Bureau of Occupational Extension and Industrial Services of the New York State Education Department.

The program was devoted to problems of promotion, organization, and conduct of over-all community programs of adult education with particular emphasis on those phases where teachers, supervisors, and administrators of industrial arts and vocational industrial education can play an important role.

The topics were discussed through general and specialized group meetings. Both avocational and vocational offerings were considered in such areas as: (1) avocational and vocational arts and crafts; (2) pre-employment training for adults; (3) apprentice training; (4) occupational extension or upgrading training; (5) veterans training; and (6) management development and in-plant training service for industry.

Provisions for housing and eating were made through the facilities of the college dormitories and dining rooms.

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THE 1953 AVA CONVENTION

The 47th annual convention of the American Vocational Association will be held in the Conrad Hilton Hotel, Chicago, Ill., from November 23 to 28, 1953.

Hobart H. Sommers, assistant superintendent of schools in charge of vocational education, is the General Convention Chairman. His office is at the Chicago Board of Education, 228 North LaSalle St., Chicago 1, Ill., where information may be obtained concerning convention details.

Dr. Sommers is collaborating with Dr. M. D. Mobley, AVA executive secretary, Washington, D. C., in the preparation of the convention program.

Facilities will be available for scheduling the largest commercial exhibit in the history of the association. More than 150 booths will be packed with educational and industrial data and merchandise.

Miss Martha Creighton, of the Virginia Polytechnic Institute, Blacksburg, Va., is the 1953 president of the American Vocational Association. — *H. F. Gilson, publicity chairman.*

CENTRAL CONNECTICUT INDUSTRIAL ARTS ASSOCIATION

The Central Connecticut Industrial Arts Association has chosen the following men to serve as the 1953–54 officers: president, Thomas Montleone, New Britain, Conn.; vice-president, Cesidio Sylvestro, E. Hartford, Conn.; secretary, Harold F. Kibbe, Jr., So. Windsor, Conn.; and treasurer, George W. Barnhardt, Waterbury, Conn. — *Harold F. Kibbe, Jr.*

♦ The 1953 Four-State Conference will be held at the Kansas State Teachers College, Pittsburg, Kans., on Friday and Saturday, October 2 and 3.

The main speakers are Dr. Joseph R. Strobel of the U. S. Office of Education, Dr. M. Ray Karnes of the University of Illinois, and John N. Frank of The Frankoma Pottery, Sapulpa, Okla.

A varied program of sectional meetings has been arranged for industrial arts, trade and industrial education, and distributive education, centering around the improvement of instruction. Commercial exhibits and displays complete the well-balanced program. — *J. V. Melton,* Secretary.

♦ The Mississippi Valley Industrial Arts Conference will be held on November 12, 13, and 14, 1953, at the LaSalle Hotel, Chicago, Ill.

Verne C. Fryklund, president of The Stout Institute, Menomonie, Wis., is the chairman.

♦ The Indiana Industrial Education Association held its annual meeting at Hammond, Ind., on April 23 to 25, 1953.

The following officers were elected: president, R. Paul Lightle, Fort Wayne, Ind.; vice-president, Prof. Ammon Swope, Purdue University, West Lafayette, Ind.

The convention in 1954 will be held at French Lick Hotel, French Lick, Ind., on March 25 to 27. — *H. G. McComb,* secretary-treasurer.

♦ The Kentucky Industrial Arts Association held its annual meeting in Louisville, Ky., on April 16, 1953.

Dewey Barich, director, Ford Motor Company Industrial Arts Awards, spoke at a joint meeting of the Industrial Arts Association and the Trade and Industrial Education Association. The industrial-arts teachers of the Louisville schools sponsored an exhibit of industrial-arts projects which were displayed at duPont Manual High School.

(Continued on page 9A)

Atlas

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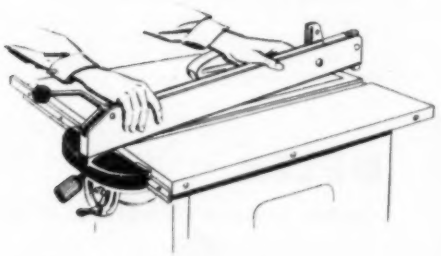

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When you need to add, or replace, a power saw in your shop, look thoroughly at the Atlas 10" floor saw. Here is the saw that is built for heavy-duty service — built to meet your needs dependably, year after year.

As you would expect in a fine saw, it is soundly engineered and carefully made. In addition — *and only Atlas has it* — is the patented rip fence that saves so much time and so much wasted stock each year. Be sure to see it, and compare its operation with outmoded types of fences.

The 10" saw with solid, precision-ground extensions — optional at extra cost — is preferred by many industrial arts departments. In schools that saw large boards and panels, Atlas-developed grill type extensions are available.

If you're in the market for a saw next term, ask your Atlas dealer to show you all the features of the 10" floor saw, or send for latest woodworking tool catalog.

Close-up to show the exclusive Atlas fence design, and vernier control for hairline accuracy.

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"Our school was the first of its type, we believe, to introduce woodworking tools in connection with instruction of blind youth.

"At the beginning, the Bureau for Handicapped Children which supervises this school was not sure that blind pupils could be safeguarded from possible accidents in the use of power tools.

"I had been teaching here for over 5 years and was convinced, from my own training at the Minnesota School for the Blind, that well-built power woodworking units, incorporating the best safety features, could be used.

"To convince the others, I installed a Delta circular saw in my garage workshop. Demonstrations of my own operation of this tool convinced my associates that pupils could be taught to use Delta Power Tools with safety.

"So, in 1928, the school bought its own Delta tools: a circular saw, drill press, belt sander, jointer and lathe. "*We have never added an extra safety device to any of our Delta tools.* And, in all the years in which these machines have been used, no pupil has suffered an injury that required medical attention."

So it goes with Mr. Frederick Hoyer, another satisfied school instructor—an instructor that finds Delta tools safe, even though he is blind. What better proof that Delta tools are your best buy! Stop in at your Delta dealer—he'll be glad to show you the complete line.

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ASSOCIATION NEWS

(Continued from page 6A)

The Kentucky Industrial Arts Association elected the following officers for the school year 1953–54: president, John D. Rowlett, industrial arts department, Eastern Kentucky State College, Richmond, Ky.; vice-president, Harold K. Doane, instructor, duPont Manual High School, Louisville, Ky.; secretary-treasurer, Willard E. Swinford, instructor, Southern High School, Jefferson County, Louisville, Ky. — *John D. Rowlett.*

♦ The officers of the New York State Vocational and Practical Arts Association for the school year 1953–54 are:

President, Joseph C. Deluhery, Buffalo, N. Y.
General vice-president, George C. Dodge, Cincinnatus, N. Y.
Treasurer, John A. Storm, Oswego, N. Y.
Membership secretary, Blanche Nechanicky, Albany, N. Y.
Recording secretary, Reno S. Knouse, Albany, N. Y.

♦ The 16th annual convention of the New England Industrial Arts Association will be held on Friday and Saturday, November 6 and 7, 1953, at the Hotel Stratfield in Bridgeport, Conn.

Conventions are important to the industrial-arts teacher for many reasons. Primarily he is working to do a better job of teaching. He is interested in better equipment and better instructional material. Come and meet and talk with your fellow teachers and the folks who supply the tools of instruction. — *Edward P. Stach, local convention chairman.*

♦ The joint committee of the American Vocational Association and the National Safety Council has developed a National Standard School Shop Safety Inspection Check List according to Dr. Wayne P. Hughes, director, School and College Division of the National Safety Council. If a subsidy can be secured, this list will be made ready for national free distribution.

A total of 5900 children between 5 and 14 years of age were killed in accidents of all types. Of these 1100 died due to accidents in the home. — *The National Safety Council.*

Personal News

J. Douglas Wilson Retires

J. Douglas Wilson, supervisor, Trade and Industrial Education, Vocational and Practical Arts Branch, Curriculum Division, Los Angeles City Schools, Los Angeles, Calif., retired after a long and strenuous term of service, early in July, 1953.

He entered on his teaching career in Riverside, Calif., in 1918.

In 1927 he joined the teaching staff at the Wiggins Trade School at Los Angeles, and was appointed department head the following year.

In 1940 he was made the head of the War Production Training program and served in that capacity until 1945. Under his leadership, this program prepared 135,000 workers for entry into the war production industries of Los Angeles.

(Continued on page 35A)

"Maverick" usually spells trouble, in the classroom as well as out on the range. Being an unknown quantity or a "Johnny-come-lately," it leaves room for genuine doubt as to performance and to quality. And that's the reason so many experienced instructors insist upon using Kester Acid-Core Solder and Kester Plastic Rosin-Core Solder or Kester "Resin-Five" Core Solder . . . dependable "brands" for more than 50 years.

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The PARKS No. 20
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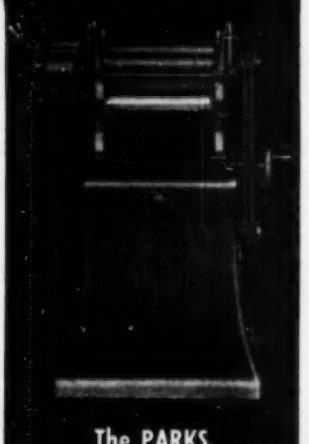
Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

Write for complete descriptive literature.

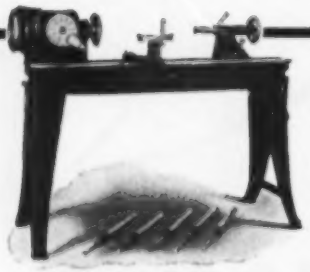
Manufacturers of Quality Woodworking Machines since 1887.



The PARKS
Heavy-Duty
12" x 4" PLANER

The PARKS WOODWORKING MACHINE CO., Dept. 24-B9, 1546 Knowlton St., Cincinnati 23, Ohio

"OLIVER"
Metal Spinning Lathe



It's easier to teach metal spinning with this lathe

Students rapidly learn to spin many useful articles of beauty from copper, bronze, aluminum, etc. This "Oliver" Lathe has a heavy bed, extra large bearings and live tail center. Takes tremendous pressures without flinching. Motor driven headstock adjustable 800 to 2750 rpm. Swings 12" diameter, 24" between centers. It's unmatched for turning wood. Write for Bulletin 159-M.

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Tool Grinders
Jointers
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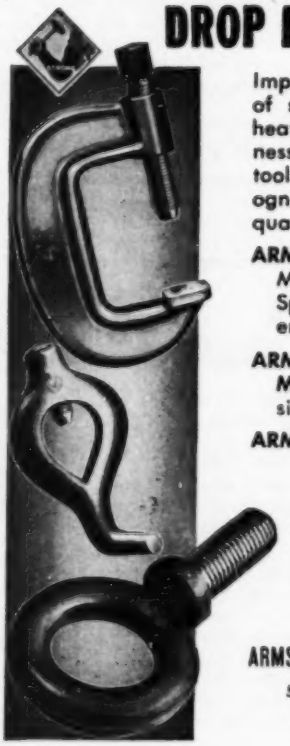

Improved designs, with bodies of special open hearth steel, heat treated to extreme stiffness and toughness . . . these tools are internationally recognized as unsurpassed in quality.

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Chicago 30, Illinois, U. S. A.

"A tool can't get greater abuse than in our training course"

says **George Caldwell,** supervisor of training,
Casey Jones School of Aeronautics, Farmingdale, New York

For 22 years, this school has been training skilled mechanics for leading aircraft manufacturers. More than 7,000 students have been enrolled in the last 20 months. The school's vocational shops use 50 Model 45 SKIL Drills and 30 Model 47 SKIL Drills.

According to Mr. Caldwell, "A tool couldn't get greater abuse than the continual turning on and off that occurs here in our training course. And remember, these are 'green' students—inexperienced operators who give tools a real beating! Maintenance requirements for SKIL Drills are *very, very* low. They can really take punishment and still give excellent performance."

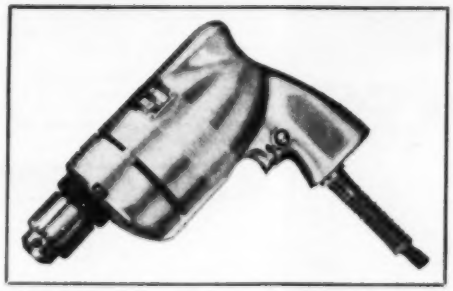
Supervisor Caldwell concludes, "We teach accuracy to the nth degree. The well-balanced SKIL Drill with extreme ease of handling is the ideal tool." No wonder SKIL Drills have been the choice of the Casey Jones School of Aeronautics.

◀ **Instructor George Olson** instructs student in proper drill handling at Casey Jones School of Aeronautics.

Answer your drill needs from the SKIL line—26 models.

SKIL ¼" Drill—Model 47

Sturdy, heavy-duty construction to withstand use of inexperienced students • All ball or needle roller bearing • Light weight, perfectly balanced • Maximum capacity in steel, ¼"; in hardwood, ½" • Can be used with drill stand as a drill press



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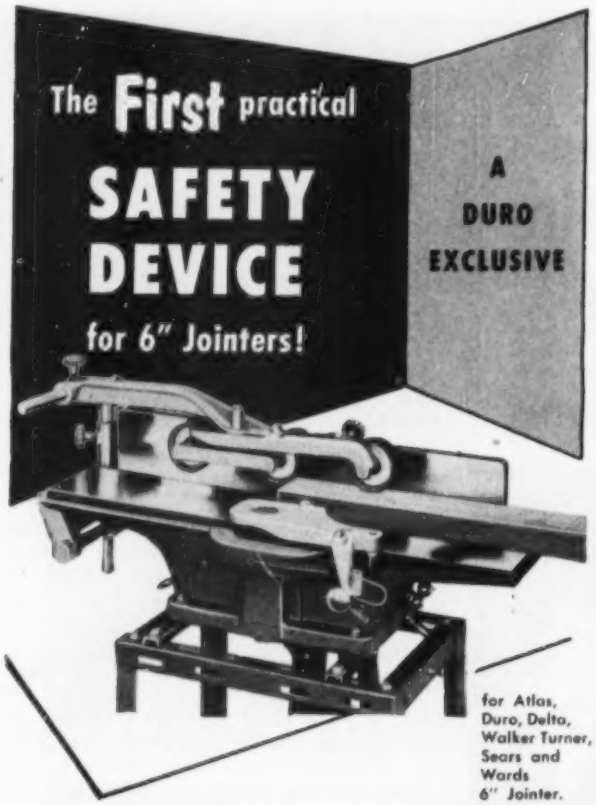

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Combination Hold-Down Pressure Guard Attachment Assures . . .

✔ accuracy
✔ speed
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The best thing you can do for your student jointer operators is to install this "job-tested" safety device on every 6" jointer in your shop. Almost automatically — you improve work quality, accuracy and most important — eliminate the risk of personal injury! A combination of factors you cannot afford to ignore.

The "Hold-Down" consists of a series of rubber covered rollers which exert downward pressure on the stock and over the cutters without the use of hands. The "Pressure Guard" provides the side pressure at table level which is additional insurance of more accurate work. The spring loaded rollers exert a continuous, sensitive pressure thruout the planing operation that human hands cannot match — it mechanically duplicates and improves the professional's skillful touch. Even warped and twisted lumber can be planed perfectly flat and smooth without a blemish — and — one operator can plane or joint lumber up to 16 ft. long — or more!

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Sample copy of Duro Crafter. (I enclose .....)
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IT'S EASIER TO TEACH accurate workmanship with the *Kalamazoo* METAL CUTTING BAND SAW

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That's why the Kalamazoo, so popular in industry, is used by so many schools.

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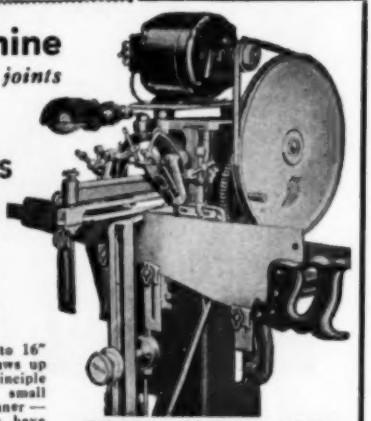
This ONE Machine
automatically files and joints
HAND, BAND, CIRCULAR Saws



The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

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Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

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Eight Tray-Top Cintilathes at Des Moines Technical High School, Des Moines, Iowa

why top schools are turning to Tray-Tops

Tray-Top Cintilathes represent a new idea in light duty engine lathes: could an all geared head with 12 spindle speeds, large spindle mounted in three anti-friction bearings, totally enclosed quick change gear box, double walled one-piece apron, flame hardened transmission gears, direct reading speed selection, and other "high priced lathe" features be built into a genuinely low cost machine? Cincinnati Lathe and Tool Co., with advanced design skills and top-notch manufacturing facilities proved it could be done. That is why more and more forward-looking vocational schools are buying Tray-Tops. Swing sizes: 10", 12½", 15" and 18". (Flame hardened bedways available.)

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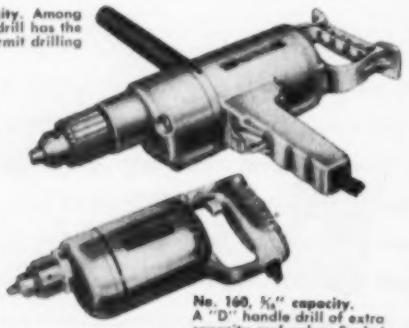
For advanced student or beginner the Mighty Midget is ideal. Its light weight (only 3⅛ lb.), balanced design and extra power make it easy to handle and accurate in operation. Its pistol grip, highly polished finish, geared chuck, removable chuck guard (extra) give it the quality features that appeal to instructors and students alike. Furnished in 6 speeds from 600 to 5000 R. P. M. Phone your dealer for a demonstration. He'll be glad to show you the Mighty Midget in action. Stanley Electric Tools, Educational Dept., 411 Myrtle St., New Britain, Conn.

No. 112 ¼" capacity. Among other features this drill has the spindle offset to permit drilling in close quarters.

No. 531A Stand. Stands are available to hold all Stanley Drills for bench operation.



No. 160, ⅝" capacity. A "D" handle drill of extra capacity and value. Sealed ball bearings, geared chuck, polished finish.

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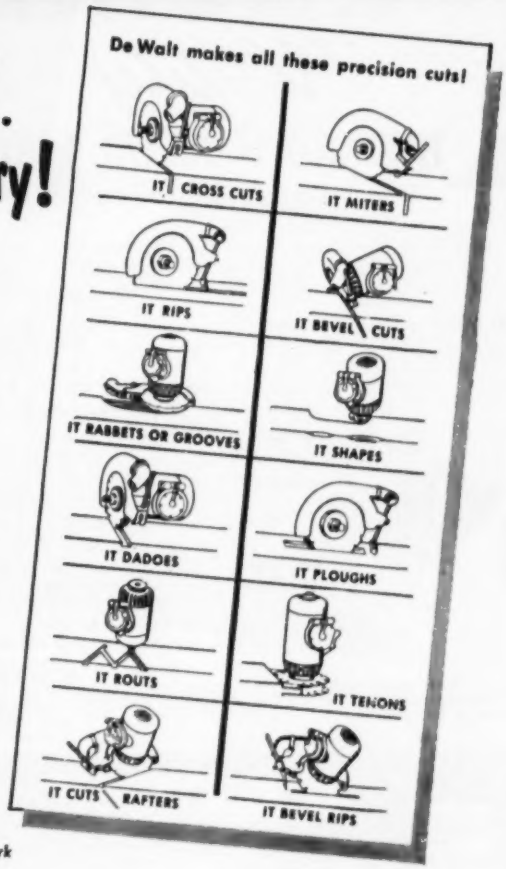

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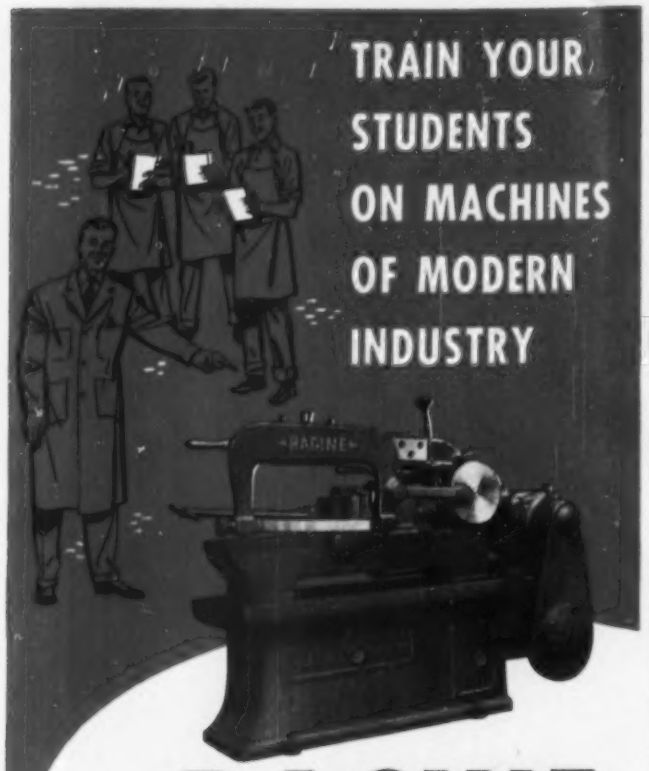

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The new Walker-Turner Light-Heavyweight line gives industrial arts and vocational schools for the first time the machine accuracy, speed, ease of operation, and safety features required for student training, *without the necessity of heavy investment.*

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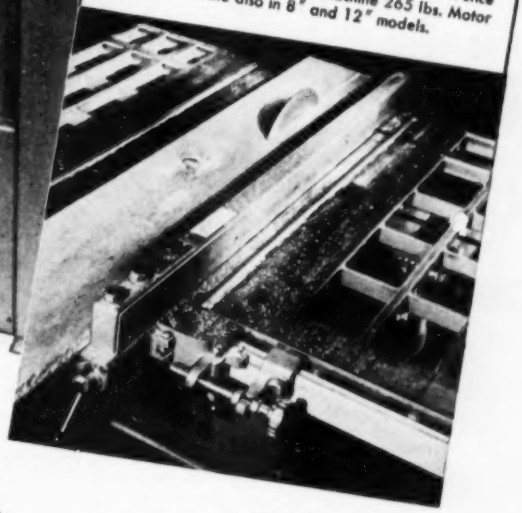
TYPICAL LIGHT-HEAVYWEIGHT 10" WALKER-TURNER TILTING ARBOR SAW

Capacity: cuts 3⅛" deep with 10" blade. 2⅛" material at 45°. 6" Dado head cuts 1⅛" deep. Saw arbor ⅝" Acme left hand thread, takes up to 1" wide dado. Speed: 3800 r.p.m. Table: cast iron, 26¾" wide x 32½" deep. With side extensions 44¾" wide. Front of table to blade 18". Safety guard, splitter and two anti-kickback pawls. Fence locks front and rear. Weight: machine 265 lbs. Motor 40 lbs. Available also in 8" and 12" models.



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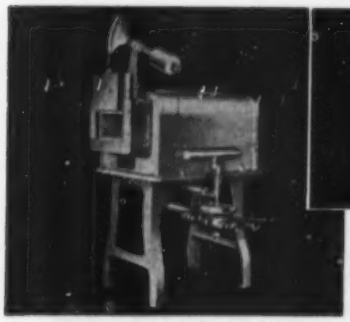

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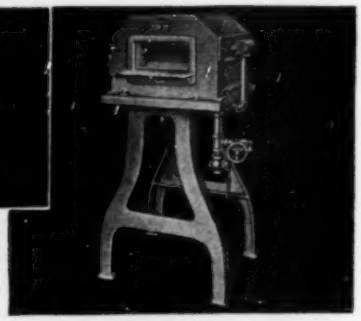

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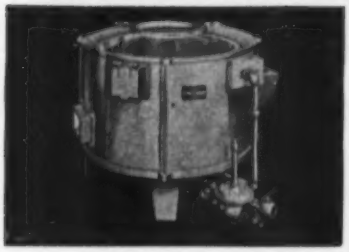
Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. For student instruction and reference, write for our free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for the new Data File on school units.



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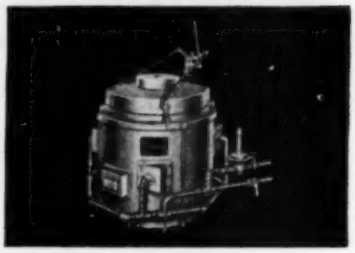
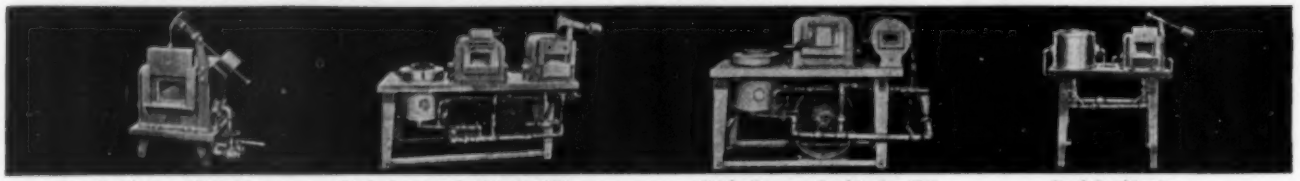
New York Office: 322 W. 48th St., New York 19, N. Y.



Melting Furnace



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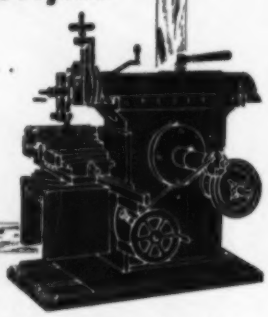

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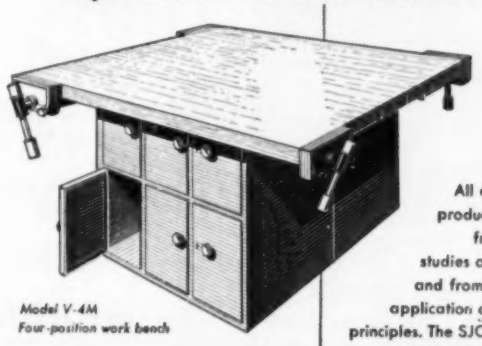

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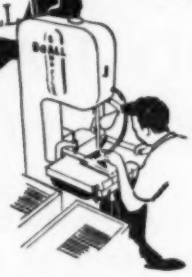

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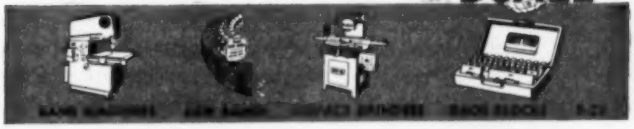

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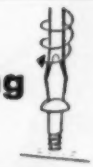

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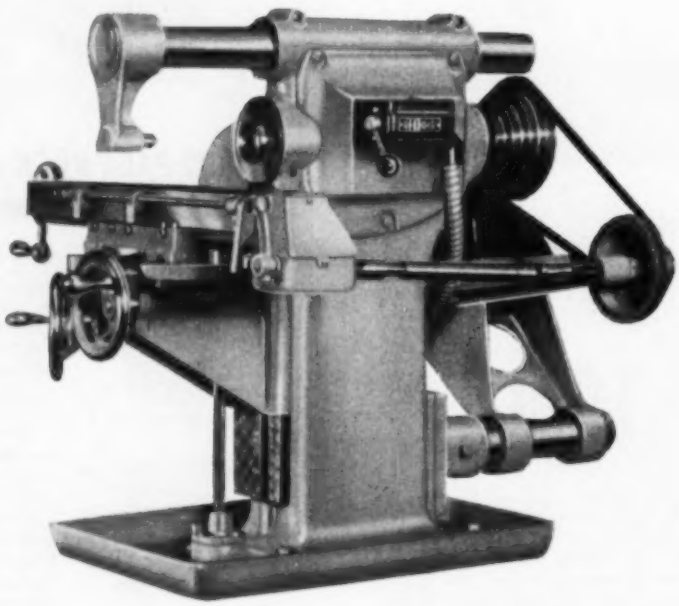

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION
The Shop Teachers' Professional Magazine
SEPTEMBER 1953

Eye Protection in a School Safety Program

ROY R. VAN DUZEE
Director, Vocational and Adult Education
West Allis, Wis.

For many years safety education has been an important activity in American schools. A person may be involved in programs or phases of safety instruction from early childhood and continue throughout his life. Such instruction may be concerned with his school and home life, his work, and his recreational activities. This instruction is a vital factor in building desirable living and working habits. The prevention of accidents on the job is important in the life of the nation. However, it is more important as a humane activity in alleviating pain and suffering and in saving lives.

Much has been written about the overall objectives, content, and activities of school safety programs. There is available much literature on safe conditions of work, safe practices, and methods of teaching them. Some attention has been given to accident reporting and the gathering of accident frequencies. However, if a dearth of published material is a criteria, there is evidently little done to safeguard the eyes of students in schools. It may be that the experience of the West Allis School of Vocational and Adult Education in this phase of safety education would be of interest.

The West Allis School of Vocational and Adult Education for many years has conducted an active safety program. It has been concerned with the safety activities in the school, the home, on the highway, and in recreation, and has carried on active programs in all of these areas. The school has always attempted to provide a safe place in which to work, to promote safe practices and habits in all school activities, and to develop safety mindedness and the proper attitude toward safety in everyday living.

Some ten years ago the school sponsored meetings of those interested in industrial safety in the community out of which grew the West Allis Safety Council. The school has continued, throughout the years, to work with the Council in promoting and sponsoring industrial safety training for local industries, both in the school and in local plants. These programs have been concerned with such areas as improving the place of work and its equipment, the work procedures and methods, the personal protective equipment and human relations, and many others.

Contact with industry and leaders in industrial safety constantly affected the school safety program. Industry urged the school to adopt industrial methods and policies so that students from the school would use industrial practices and have the proper attitudes toward industrial safety policies when they came to work in local shops.

One of the safety policies in industry which has changed a great deal in the past few years is the one having to do with protecting the worker's eyes from dust, flying materials, running into sharp objects, light flashes from welding operations, and other hazards to the eyes. At first workers were required to wear glasses when doing certain work. Later progressive firms adopted plans which designated certain areas as 100 per cent eye protection areas, which meant that all who enter such areas must wear eye protection equipment—safety glasses, eye shields, or other accepted protection. Many industrial firms now have their entire plant area designated as 100 per cent eye protection areas. As this policy spread in the locality, the need to adopt a policy designating school shops and other areas in schools as 100 per cent eye protection areas grew. Because of anticipated problems, such as securing glasses, properly fitting them, storing, sterilizing, and accounting for them in a school where there is a heavy turnover in the student body, the matter of recommending that the safety program be extended to include 100 per cent eye protection areas in the school was studied for a long time. Finally the West Allis Board of Vocational and Adult Education adopted an eye protection policy which designated certain areas as 100 per cent eye protection areas in the school and

set up basic policies to be followed in operating the expanded eye protection program.

The purposes of the eye protection program are:

A. To protect the eyes of students, employees, and visitors from injury.
B. To provide a training situation for students which will:
   1. Promote a willingness and desire to wear eye protective equipment when working on the job.
   2. Promote proper work habits through developing the habit of using personal protective equipment.

The plans set up and the ones that are being followed divide the program into two parts; namely, the day school program which includes in it both full-time juvenile and part-time adult students, and the evening school program, which has in it only part-time adult students.

The day school program is based on the plan that certain shops and laboratories are designated as 100 per cent eye protection areas; that all persons who enter them must wear approved eye protective equipment, and that for any work throughout the entire building persons working on jobs which are inherently dangerous to the eyes, shall wear approved eye protection equipment. The evening school plan is modified due to the purposes and character of the instruction. It requires that instructors in the designated areas wear approved eye protection equipment in designated rooms and that students be required to wear such equipment in designated shops and on specified jobs.

The Day School Program

Students who are scheduled to work in 100 per cent eye protection areas are required to make a deposit on eye protection equipment at the time of enrollment. Appropriate equipment is provided during the initial class session by the instructor in charge. Equipment approved for general use in the school consists primarily of the spectacle type safety goggle, metal rim, with or without side screens, as needed. Acetate rims are used near electrical equipment. Students who wear ordinary prescription glasses, and visitors, are provided with all plastic safety goggles (covers) which meet the requirements of the Wisconsin Industrial Commission. The welding shop and the foundry are supplied with special eye equipment, appropriate for activities in such shops. The deposit paid by the student is returned when the equipment is returned at the time of withdrawal. Employees of the Board are furnished with eye protection equipment gratis. The details of operation of the program were the source of study for some time due to the fact that a great majority of students in both the day and evening come on a voluntary basis. Some attend for considerable periods of time; some for short periods. The over-all situation is that there is a large turnover in students. This required that a simple but effective plan for securing equipment, fitting it, storing and using it in the classroom, sterilizing it, returning equipment, returning deposits, and finally repairing and storing the glasses and eye shields be worked out.

Eye protection equipment is procured, issued to teachers, maintained, and accounted for by a designated person. The cost of buying eye protection equipment, parts, and supplies is charged to the industrial-education department. Spectacles and eye shields are issued to students, employees, and visitors under the following plan:

1. Each instructor teaching in a 100 per cent eye protection area is provided with a supply of spectacles, shields, and other equipment for issuance to students. The equipment is of various sizes so that students may be properly fitted. Students who cannot be properly fitted are referred to the person in charge of the eye protection program. Equipment is issued to day school students by teachers upon showing that a deposit has been made for the equipment at the Attendance Office. Upon return of the glasses, shield, or other eye protection equipment in good condition, taking into account ordinary wear, the deposit is returned to the student. The equipment is marked so that each student can identify his own equipment.

2. Each teacher provides a file in which to place spectacles or eye shields. Upon entering the class, students secure their equipment, wear it continuously until the end of the class, when they return it to the file. A solution and equipment for sanitizing the eye equipment is provided in each shop. It is planned to have a supply of spectacle cleaners in each shop.

3. Teachers and other employees are furnished spectacles and/or eye shields gratis. The eye protection equipment upon being issued to the employee becomes his property. Lost or broken eye protection equipment must be paid for by the employee. When prescription glasses are necessary, the Board reimburses the employees up to a certain amount for professional services required to get prescription glasses. Maintenance personnel wear safety glasses at all times during their scheduled workday.

4. Visitors are loaned safety glasses or eye shields if their visitor's passes authorize them to visit areas which are designated as eye protection areas and they shall wear such equipment when visiting these areas. The eye protection equipment is provided when the visitor's passes are issued.

The Evening School Program

The evening school program is concerned only with adults who come on a voluntary basis. Because of the complexity of the problem of administering a program where certain areas of the school are designated a 100 per cent eye protection area, it was decided to start with the 100 per cent eye protection areas in the day school and extend it to the evening school program if it seemed feasible later. Consequently, the eye protection program in the evening school program requires that all shop teachers and maintenance men wear safety glasses at all times, that students in the welding shop wear approved eye protection equipment at all times as do students in other shops who work at certain types of operations.

Conclusion

The designation of certain areas as 100 per cent eye protection areas is an extension of a broad safety program which has been in operation in the West Allis Vocational School for many years. It came as a result of working closely with industry in the local accident prevention program. The program has been well received by industry. While the program is a worthwhile one and is of unquestionable value in saving eyes, it is not easy to operate. It requires considerable planning to get it started. It involves establishing routines, to take care of issuing visitors' safety glasses or eye shields, providing prescription glasses for Board employees, checking the eye protection equipment in use in the shops, and in seeing to it that each student wears his safety glasses or eye shields constantly, and that no person enters the restricted area without having eye protection.

Check List for the Beginning Teacher

DEMPSEY E. REID
Assistant Professor of Industrial Arts Education
Western Illinois State College
Macomb, Ill.

The Check List

The beginning teacher, just graduated from college, has many problems to face as he prepares for his new teaching position. None of these problems are unsurmountable if the teacher will foresee them, plan his solution, and follow through on his attack. The experienced teacher will foresee many of these problems and plan accordingly, but the new teacher should study them, analyze, and apply the solution to the best of his ability.

Most of the teacher training institutions are presenting these problems during the four-year course of study, but the student has not seen the need and has too often passed them over as a necessary duty or assignment to obtain a passing mark from the course. Near the close of their senior year they begin to reflect on their experiences and try to assemble them in a logical form so they will be able to proceed in their new position with some security and satisfaction that they are prepared to face the problems.

The Interview for the Teaching Position

The interview for the teaching position is very important and should be a two-sided interview with the applicant asking questions as well as the board of education or the superintendent. It is through this first interview that the new teacher is able to learn many of the items that will help make his teaching situation more pleasant and also help in his decision of positions. It is through the questions at the interview that the teacher is able to learn the factors that will guide him in his preschool preparation for the job.

The necessary correspondence preliminary to the actual interview aids the teacher in making the interview as informative as possible, and he should be prepared to present himself in the most favorable light. The small town board that meets on Monday night are probably farmers and small town businessmen who do not stand on too much formality. Their dress will probably be appropriate to their positions, and their interests, to a great extent, will be locally centered. The dress of the new teacher should meet with the situation. A well-groomed, clean, neat appearance in old clothes makes a better impression than a sloppy careless appearance in new clothes. The new teacher will find it helpful to secure a copy of the local newspaper and read of the interests of the community. In a mining area he should be able to talk about mining; if it is a livestock feeding area, be able to talk sensibly about livestock; if it is an industrial area, know something about those industries. The superintendent in the larger cities will probably be the interviewer for the board of education. In such cases it might be possible to learn the outside interests of the superintendent so you will have something in common to talk about, whether it be golf, farming, music, fishing, or airplanes.

The opening of the interview is usually the more serious part of the meeting. As the teacher and board become better acquainted the conversation turns to more "off the record" talk. The teacher should be businesslike and be prepared to ask questions at the proper times. The first items usually discussed are the position itself, what it is, the way it is to be handled, and the duties of the new teacher.

Using the Check List

The check list at the back of this article is to be used as a guide for the new teacher. By checking off the items listed, the teacher can have a better understanding of the new position. In some cases it will be necessary to write out notations detailing some of the important items.

This first meeting is when the new teacher should ask questions such as are listed in Unit I, Table I. The questions concerning school organization and administration will be welcomed by the superintendent as he will have a chance to sell his school to you. During this discussion the teacher should interpret the type of school organization that is being stressed, such as the platoon system, a comprehensive school, departmentalized program, core curriculum, or any one of the many other types of organization. The new teacher should then learn just where he will fit into this plan!

The shop teacher will be interested in the item of finance. He should clearly understand the methods used for obtaining supplies, the school budget system, his shop budget, method of handling materials, and how all this fits into the total picture of the job to be done.

The other major item in this unit is the requirement placed on the teacher — the size of the classes, number of classes, types of students, specials, and the extra-curricular activities expected of the teacher. The teacher should learn the demands of the community — is he expected to conduct a hobby class for adults, does he handle school repair, and will he be asked to take over some apprentice classes? The answer to some of these might put the position in a different light.

The salary offered might be discussed here, but the teacher should not make a point of it until the right time. The proposed salary could increase as you sell yourself to the administration; maybe you should let him bring it up.

The other items in this unit are important, and they are self-explanatory. This list is not complete for all teachers,

but it should present problems from which the new teacher can draw to help him understand his job.

Visit to the School Shop

The formal interview should be followed by a visit to the school shops; but if the administration does not suggest it, the teacher should watch for the opportunity and ask if he may see the shop. During this inspection he should show an interest in the tools, equipment, materials, and general layout and if at all possible he should make some favorable comment about the activities of the previous teacher. This comment might be followed by asking why the previous teacher is leaving, or why he was not rehired.

The items in Unit II give the teacher a chance to sell himself to the superintendent, showing that he has an interest in his work and knows something about it. The former teacher may have been highly respected, so the prospective teacher should not be too critical of the things he sees of which he does not approve. The professional attitude should be maintained throughout the interview. The needs of the shop in the way of equipment, tools, and materials, should be noted and here again the teacher should try to see if the equipment is adequate to do the job expected of him. If the administration wishes welding included in the machine shop, is there space available for a welding unit, is ventilation proper, can a corner be arranged for arc welding, and is there money available to purchase the needed equipment? Be careful not to say, "Yes, I can do it," then later find it is almost impossible.

The other items in the unit may be checked at this time, or possibly left until the preschool preparation.

The items listed in Unit III in the check list are most important to the new teacher. Some of these items should certainly be checked during the first interview. The credentials which have probably been studied by the superintendent before the interview will tell him about your *mores* but you should also know something about the community customs, habits, expectations, and social conditions.

The housing possibilities is probably the most important item in this unit. A married man with a family will not be a happy teacher if his family cannot be with him, or if their living conditions in the community are not satisfactory for his family. The small community is especially bad for a married man to take a room and leave the family elsewhere. The town gossips will take every opportunity to make an issue of this and publicity is always harmful no matter what the source. The teacher should fully understand the housing situation and see if he can be assured of adequate housing.

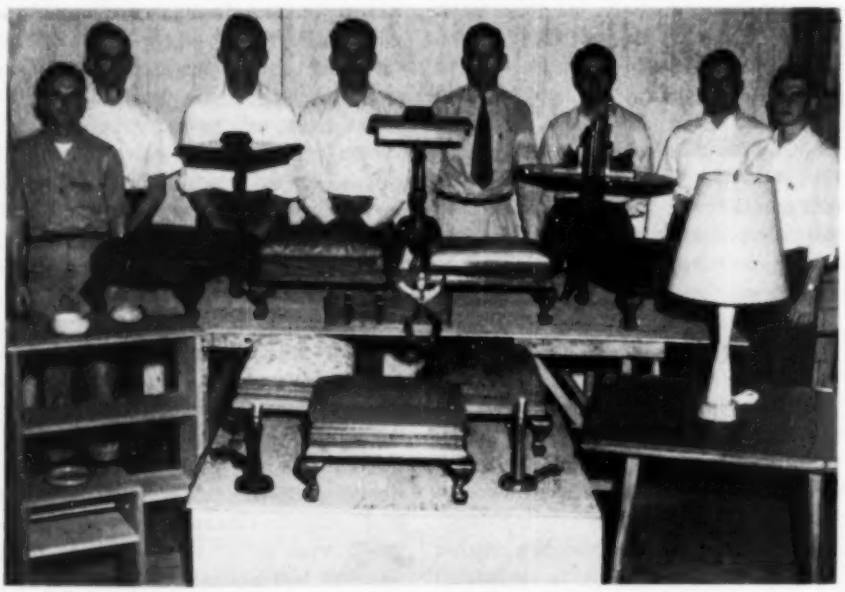
The social activities required of the teacher are next to housing. The expectations of the teacher in joining clubs, lodges, fraternal groups, civic groups, and service clubs can often mean failure for the new teacher, both financially and in his teaching preparation.

The other important item in this group is the political, social, and religious factions of the community. Most schools today are very tolerant on these items, but some are very much prejudiced. The teacher is usually much better off not to publicly take any stand in politics, take religion as a matter of course, and keep from becoming involved in any social clique that may cause ill feeling from another group.

The other factors in this unit are self-explanatory but should be investigated thoroughly at the time of the interview if possible.

The interview should be conducted as businesslike as the situation demands. The teacher should be prompt in his appointment and be ready to leave when the interview is over. Most superintendents are too busy during the hiring season to spend much time with any one candidate. Do not wait for him to offer you the contract to sign; if he wants to hire you he will let you know. The teacher should not fail to make opportunity of side lights to the interview, however. A good teacher has a sense of humor and will display it when he has the occasion. This also often helps to ease the tension of the new teacher. The new teacher that goes for an interview with the questions mentioned in these first three units will also be able to talk. Superintendents will overlook a very capable person because they only listened during the interview and did not raise any questions themselves. The way you present ideas, the quality of your voice, your interest in the situation, your alertness and the way you present questions will all be noted by the superintendent and help him decide on your application.

The teacher that is hired for a new position should not stop with the interview and take a vacation until the opening day of school. There are many items to be considered before school opens and there



Projects made in a woodworking class during a summer session at California State Teachers College, California, Pa. — Personages, left to right: J. Comp, E. Montgomery, A. Hrynowich, T. Writt, instructor, A. C. Wenzel, instructor, A. Kosuth, I. Siar, and L. Waitkus

— Photograph, courtesy of Arthur C. Wenzel

is usually some work that should be done by the shop teacher.

Things to Be Done Before the School Opens

Unit IV in the table lists some of the items to be considered before school opens. One of the major factors is the preparation of the shop itself. If at all possible the teacher should visit the shop early and make a check of things that need to be done. Study the inventory, if there is one, check the condition of equipment, the amount of materials, shop layout and major changes you would like to make. This check list should be divided into two groups — those things that must be done before school opens and those that might be done after school opens.

The first group will include the ordering of new equipment, tools, materials and supplies, and major repairs that the school administration should have done by outside workmen.

The second group might include the repair of small tools, conditioning of equipment, inventory of materials, planning of tool panels, and other items that might be worked as a student activity. Valuable teaching should come from such activities in which the student does the work. This planning also helps ease the preschool load of the new teacher.

The delivery of equipment, supplies, and materials in many cases is a lengthy process; therefore the teacher should place his order as early as possible to facilitate his planning. The teacher should make a thorough check before the orders are placed to see what he has on hand, hidden away in closets, in storerooms, what the janitors have that belongs in the shop laboratory, and what equipment may already be on order.

Most school shops in the smaller communities are used during the summer by the janitor so it is advisable to have a few days before school opens to condition the shop in appearance. The new teacher with a clean shop, tools in order, a clean floor, attractive bulletin board, and suitable work and study areas has gone a long way in his planning for the opening sessions. The first impressions made on the student will be favorable and lasting.

These items can best be handled by the teacher after he has moved to the community. If at all possible the teacher should allow himself plenty of time to do the job and do it well. The factors should be critically analyzed and planned so that enough time will be made available; a week or ten days is usually the maximum of time needed. The teacher with a family should certainly not plan to move and settle in his new house or apartment and condition the shop over the week end before school opens on Monday.

Unit V lists some of the items which a teacher should be thinking about from the first of the interview. The curriculum and courses of study will be affected by almost every item mentioned beforehand as well as many which will be discussed later. The shop layout, equipment, tools, size of class, length and time of classes, budget, types of students, community needs and interests, student personnel, and school organization will all affect the curriculum in industrial arts. The curriculum the new teacher plans will also affect the materials and supplies which he orders before school opens; the curriculum will affect the shop layout and units of instruction as well as the methods to be employed in teaching. It is hoped that the teacher will have gained sufficient knowledge in his college work to enable him to plan a course of study which will do the job that needs to be done.

The teaching or instructional materials listed under Unit VI must be started before school opens. Without these materials the teacher is going blindly down the road, the students will lose interest, a general shop will become a general mess shop, and a crafts program will become a hodgepodge of nothing. The teacher should have the course outline, the initial instruction sheets, job sheets, assignment sheets, work stations, class organization plan, teaching aids, and projects organized in such a manner that the first day will be meaningful and motivating to the students. A strong beginning in class organization will help bring out a meaningful course throughout the year. It is not necessary that the entire first semester's work be planned in detail. That can be developed as the class moves along, but the first week should be planned sufficiently to lead the students into and through the desired experience.

The final unit is that of a community survey. This should certainly be made during the first year of teaching and if possible some of it made before the end of the first month of school. The items listed in Unit VII can be most helpful to the new teacher. It will help him plan his course of study according to the interest and needs of the students. It will show him where he can buy supplies and materials, where he can get repairs done, and places through which he can order supplies and materials not otherwise available.

The community survey is likely to present teaching aids in the way of displays, visuals, samples, demonstration material, and men in the area upon which the teacher can call for lectures and demonstrations. It is during this type of survey that field trips might be planned and arranged. Last, but not least, in this unit is the survey of social and entertainment places the teacher can enjoy.

Table 1. Check List for Beginning Teachers

Items to Know Before School Starts

UNIT I — *School Organization and Administration*
- Type of school organization
- Size of classes
- Time and frequency of classes
- Budget and requisitioning
- Chain of command in administration
- Extracurricular activities
- School repair required
- Adult or evening classes
- Salary

UNIT II — *Physical Plant*
- Type of shop organization (unit or general)
- Shop location and size
- Amount and kind of equipment
- Amount and kind of tools
- Materials and supplies on hand
- Needed tools and equipment
- Shop library
- Fire precautions and exits
- Toilets and washing facilities
- Storage areas

UNIT III — *The Community*
- Housing facilities
- Social possibilities (private groups)
- Service clubs, lodges, civic groups
- Political attitudes
- Religious attitudes
- Transportation to and from school
- School cafeteria or nearby restaurant
- Shopping areas
- Comparative costs of living
- Attitudes toward smoking and drinking
- Requirements of clothing worn in shop

UNIT IV — *Shop Conditioning*
List of things needed to be done
Check on last year's inventory
Condition of major equipment
Tool panels and storage
Heating, lighting, and ventilation
Bulletin boards
Teaching aids left from past years
Ordering of supplies and materials
Shop prepared for first day of school

UNIT V — *Course of Study and Curriculum*
Equipment necessary to do the job
Size of class and its effect on the shop organization and courses of study
Length and frequency of class periods
Student organization
Shop planning and layout to fit the course of study
Financial problems in course planning

UNIT VI — *Instructional Materials*
Course outlines
Instruction sheets: job sheets; assignment sheets; procedure sheets; information sheets
Student organization plan
Visual aids (films, slides, charts, models, etc.)
Bulletin board material

UNIT VII — *Community Survey*
Industries in area
Equipment and supply houses
Field trip possibilities
Outside lecturers and craftsmen
Social and entertainment areas (theaters, country clubs, restaurants, etc.)

This check list will not cover all situations, and there are probably some items that will not apply in all positions, but each new teacher should have a plan for moving into the new position. This list can act as a guide and will only be as helpful as the teacher makes use of it.

The new teacher should not construe the meaning of such a guide to the extent that he tries to do all the things listed before school opens. There are many of these items that will be easier and more natural to answer after school is under way. The important thing is to see that first things come first and that a job is done when it needs to be done. The teacher that runs his classes instead of letting his classes run him has gone a long way toward being a successful teacher.

A good rule to follow is to see the problem, analyze it to the fullest, plan the procedure for solving, and then make every possible effort to complete it.

Analysis of Course-of-Study Materials for Industrial Arts

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It is quite possible to devise satisfactory procedures and necessary forms for identifying, analyzing, and partially organizing educative experiences in the several trade and handicraft "areas" of industrial arts. These procedures reveal course materials from which courses of study in industrial arts are organized. The analyses include specific contributions to: manual skills; various categories of trade and industrial knowledge; appreciations, habits, and attitudes associated with an industrial society; general personal development and maturation.

In the past industrial arts has relied largely upon the analysis forms used chiefly in trade analysis, such as lined charts, the "block" system, and lists of things to do or know. Some educators in industrial arts are in revolt against these types of course analysis techniques. Among other objections, they are said to be too circumscribing, they prevent student initiative planning, and they are not well adapted to general industrial arts. All of these objections have degrees of validity, if the analysis techniques are used in their traditional forms. So far our professional writings have not provided much help in the form of substitutes for or modifications of the original forms of analysis. They need to be simple, objective, and of such nature that *student teachers in training* and *beginning teachers* can apply them.

The techniques described herewith have been in process of development and in experimental use over a period of several years. There are unquestionably other procedures. These are offered for what value they may offer in meeting a present professional need where some confusion now exists, and in the hope that others will improve or find better procedures.

We do not here defend the relative values of the several common aims of industrial arts applied to the curriculum area as a whole, or to individual trade or craft areas, in either general or unit shops. Some of the most common aims of industrial arts recognized as bases in analysis techniques, are: handy-man skills, exploring for guidance, consumer knowledge, avocational-creative handicrafts, development of desirable habits, attitudes and appreciations, planning and problem solving, and joint learning through the avenues of *all* senses.

For the purpose of presenting the accompanying forms of analysis technique through illustrations, a number of assumptions based on one's philosophy of industrial arts and of industrial-arts analysis are essential. They involve curriculum, courses of study, correlation, aims, shopwork, related information, and organization of content. No one need accept all of the following assumptions, used as bases for the two examples of analysis forms illustrated later.

Bases Used in Developing Analysis Forms, and Applying Them to Graphic Arts

1. The degrees of skill taught in industrial arts should be taught correctly so that later unlearning and relearning are not necessary.

2. Various categories of related industrial information are either: (1) required

CHART 1. Analysis of Essentially Manipulative Experiences (some required information) in Industrial Arts GRAPHIC ARTS — Grade 9

MANIPULATIVE AIMS EMPHASIZED	GROUPS OF PROBLEMS (required, optional, projects)																
Chief Aim or Aims: Consumer knowledge and appreciation Chief Secondary Aim or Aims: Exploring educational and vocational guidance Avocational, creative handicrafts Generally Common Aims: Learning through touch plus other senses Habits and attitudes (work, safety, co-operation, etc.) Purposeful problem, solving experiences	Req.	Optional				Optional		Req.	Possible "Projects"				Possible Projects		
Problems	1	2	2	2	2	3	3	4	5	5	5	5	6	6	6
Operations (or jobs) and required information	Student name	Center a name	Set paragraph	Set half diamond	Set 4-line verse	Leader job	Rule job	Writing pad	Name card	Personal stationery	"Name" napkins	Other?	Lino. block print	Silk screen job	Other?
EXPLORING: EDUCATIONAL AND VOCATIONAL GUIDANCE															
Composition															
Learning the case	x	x	x	x	x										
Justification	x	x	x	x	x	x	x		x	x	x	x			
Placing in galley									x	x	x	x			
Tying type forms		x	x	x	x	x	x		x	x	x	x			
Proofing and proof-reading		x	x	x	x	x	x		x	x	x	x			
Correcting composition	x	x	x	x	x	x	x		x	x	x	x			
Cleaning type form		x	x	x	x	x	x		x	x	x	x			
Distribution	x	x	x	x	x	x	x		x	x	x	x			
Imposing															
Locking forms in chase									x	x	x	x			
Testing									x	x	x	x			
Platen Presswork															
Inking									x	x	x	x			
Placing chase in press									x	x	x	x			
Make-ready of press									x	x	x	x			
Feeding press									x	x	x	x			
Cleaning press									x	x	x	x			
Safety in operation									x	x	x	x			
Embossing												x			x
Paper Cutting															
Calculating paper stock								x	x	x	x	x	x	x	x
Saftey in operation								x	x	x	x	x	x	x	x
Cutting paper								x	x	x	x	x	x	x	x
Binding															
Stapling — hand, foot treadle												x			x
Padding								x							
AVOCATIONAL CREATIVE HANDICRAFTS															
Linoleum Block Printing															
Making design													x		
Transferring design													x		
Carving													x		
Printing													x		
Silk Screen Printing															
Making design														x	
Cutting stencil														x	
Transferring stencil to screen														x	
Printing														x	
Cleaning														x	

CHART 2. Analysis of Essentially Informative and Personal Development Experiences in Industrial Arts GRAPHIC ARTS — Grade 9

INFORMATIVE AND DEVELOPMENTAL AIMS EMPHASIZED	Directions: Classify instructional units in informative subject matter and development of personal qualities under appropriate "Aims" headings in lower left column.
Chief Aim or Aims: Consumer knowledge and appreciation Chief Secondary Aim or Aims: Exploring, educational and vocational guidance Avocational, creative handicrafts Generally Common Aims: Learning through touch plus other senses Habits and Attitudes (Work, safety, co-operation, etc.) Purposeful problem-solving experiences	Point of correlation with manipulative work. (See Analysis of Manipulative Instruction) — Shop Problems Levels
Informative and Developmental Instruction Units	
CONSUMER KNOWLEDGE AND APPRECIATION	
Body and display type	Problems 2 & 5
Identifying common papers	Problems 4, 5 & 6
Color in printing, inks	Problem 5
Embossing	Problem 5 or 6 (other)
Engraving and plates	Problem 5
Ornaments & borders	Problem 5 or 6
Proof-reading	Problem 2
Characteristics of good presswork (samples)	Problem 5
Various ways of binding	Problem 4
Preparation of layouts	Problem 5
Analysis, commercial printing costs	Problem 5
History of printing	Problem 6
EXPLORING: EDUCATIONAL & VOCATIONAL GUIDANCE	
Printing trades: Requirements and opportunities	Problem 3
Organization: Unions, management	Problem 3
Training: School and on the job	Problem 3
AVOCATIONAL: CREATIVE HANDICRAFTS	
Sources: Linoleum-block & silk screen references	Problem 6
Sources: Equipment, supplies	Problem 6
Design and layout	Problems 5 & 6
LEARNING WITH EMPHASIS ON TOUCH (FEELING)	
Checking justification in a composing stick	Problems 1, 2, 3, & 5
Testing type forms for "life"	Problem 5
Separating letters of word in distribution	Problems 1, 2, 3, & 5
Sorting spacing materials on galley	Problem 5 or 6
Picking 1 sheet in presswork	Problems 5 & 6
HABITS AND ATTITUDES	
Co-operative jobs (cleaning presses, etc.)	Problems 5 & 6
Avoiding waste, school supplies	Problems 4, 5, & 6
Safety with press and paper cutter	Problems 4, 5, & 6
Safety: Cleaning fluids and cloths	Problems 5 & 6
Proper dress for different jobs	Problems 5 & 6
Exactness essential in craftsmanship	Problems 1 to 6
Student personnel management plan	Problems 1 to 6
PROBLEM-SOLVING PATTERNS AND PRACTICE	
Border around a form	Problem 6
Tabular composition	Problem 6
Planning a printing job	Problems 3, 5, & 6
Imposing 2-page sheet	Problem 6

in the satisfactory learning of manual skills, or (2) are additionally broadening in knowledge about certain aspects of trade and industrial and craft life in our enlarging general culture.

3. The common aims of industrial arts, reflecting the needs of individual students, youth in general, and current American society are the criteria used in selecting the learning experiences required in the junior high school years, and the elective personal-interest learnings of industrial arts in senior high schools.

4. The several generally accepted aims of industrial arts reflect degrees of manual, informative, and other personal-development content, but for purposes of analysis these aims can be classified as essentially manual or essentially informative.

5. The commonly accepted aims of industrial arts must provide the bases for finding and selecting the educative experiences in developing certain desirable habits, attitudes, appreciations, and other personal unfoldings, as well as the bases for selecting experiences in skills and related information.

6. Certain shop areas, because of their inherent nature, lend themselves to the accomplishment of designated aims better than do other shop areas.

7. An industrial-arts shop area need not restrict its instruction to a single designated trade or handicraft.

8. Assigning one or two aims in a course to a position of chief importance, depending on the shop area: (1) adds to the usefulness of an analysis form, and (2) assists in bringing clarity and direction to the content organization, shop management, teaching, and equipment needed in the development and conduct of a course.

9. A course analysis form must provide opportunities for the course maker to plan for: (1) required class problems, in some instances, (2) somewhat similar but optional problems for particular students through the *group*[1] method of selection, and (3) pupil-initiated four-step projects.

10. Course-analysis forms must provide for ready and constant checking of all of the important educative experiences with the primary and secondary aims established for a given shop area.

11. Course-analysis forms must be so arranged that the several items concerned with manual skills, related information, and pupil personality growth can be seen, one in relation to the others, that their correlation or co-ordination can be determined and noted.

[1]Griffith, Ira S., *Correlated Courses in Woodwork and Mechanical Drawing*, Charles A. Bennett Company, Inc., 1912.

The Complementary Course

In the complementary course analysis charts, Charts 1 and 2, one might start either by listing those teaching units which are essentially manual or those that are essentially informative. The character of the chief aim or aims of the course might be the deciding factor in determining where to begin the analysis. Practice seems to indicate that it is generally easier to correlate that which is essentially informative with that which is chiefly manual. In the illustrations which follow, the chief aim and secondary aims (directions of purposeful educative effort) were selected from those stated briefly in the foregoing, because graphic arts seems in junior high schools to be an appropriate medium for accomplishing these aims above some others.

In this discussion and in the charts, *problem* is interpreted as meaning any kind of purposeful and thought-provoking shopwork. *Project* is used only for self-initiated and planned shopwork which the student also executes and evaluates.

In Chart 1, it should be noted that those who prefer to start the analysis of the shopwork with operations (or unified small jobs) may do so. Those who prefer to begin with articles, problems, experiments, and projects may likewise do so. Some may wish to start with elements in both.

One would probably start with operations in most cases where the chief aim of the course is exploring vocations for guidance. On the other hand, where handy-man skills for home mechanics or handicrafts for avocational purposes are the primary aims, one would probably start his analysis with problems and projects.

It should be noted that it is possible to use the form, Chart 1, for required assignments, for options within a group all requiring essentially the same manipulative operations, or for four-step projects. Most industrial-arts teachers still wish to have some assigned manual problem or problems at the beginning of a course or course area to provide the minimum of skills necessary to get the coursework under way and regularized to some degree. Student options from groups, or real student projects should certainly follow.

Chart 1 keeps the aims selected for a course or course area constantly before the analyst and course maker to help give continuous direction to the analysis of course content. The aims must also be placed in the chart and contributing educational instruction units listed under each aim. This does much to assure the achievement of stated aims, rather than later *claims*. While the several instructional units are listed and properly classified in the left-hand column, they need not necessarily be in this order in the resulting outline of instruction which is detailed in a course of study.

The Units of Instruction

Chart 2 is devised to outline units of instruction which fall outside and beyond the technical information essential in conducting satisfactory learning in the manual instruction. Certain aims of industrial arts such as exploring for vocational guidance, and developing discriminating consumers of certain categories of industrial products are reflected in this analysis form.

The aims for any industrial-arts area are of course the same on the two analysis forms. These aims continue to be used as the bases for selecting pertinent units of informative instruction and of their classification, *each under the aim to which it most nearly applies*. The list of informative units are about as rich as the total background of the teacher — his studies, teaching experiences, trade experience, and the recorded and oral suggestions of his professional associates. When he builds his course of study he selects those items in each aims category which he deems most valuable for a typical class at a given grade level, and with full consideration of the number of hours available in the course or unit as a whole, and also those available for the broadening informative phases emphasized in Chart 2.

The informative units and experiences outlined in the left-hand column, Chart 2, are studied item by item, with the several items in the left-hand column of Chart 1, the essentially manipulative parts. From this study each of the informative units, Chart 2, is associated with and directly correlated where possible with the work of some problem, part of a problem, or any of several possible problems. This relationship, with notes if necessary, is recorded in the right-hand column of Chart 2.

The completed analysis of a course or course area in industrial arts does not constitute a course of study. The materials outlined constitute available materials (educative experiences). The analysis may well include more than is expected to be accomplished. The course builder uses this in setting up his complete set of plans and specifications for a given job (his adaptable course of study), which is planned for a typical class, collectively and individually, at a stated grade level.

Ceiling Heights in School Shop Planning

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During the past few months the writer has had occasion to survey the literature on school-shop planning. In addition to gathering material on regular and essential features such as floor areas, walls, windows, illumination, shape of rooms, storage, and auxiliary rooms, information on ceiling heights was of particular concern.

While the immediate desire for this information was to establish a ceiling height for a new secondary school, the primary purpose was to determine, as far as possible, a standard height that could be used in planning future school shops. Unfortunately, the information available was not adequate to meet the specific situation. Consequently, a study of ceiling heights of all metal and woodshops in local junior and senior high schools was undertaken. The result of the survey of eleven senior and four junior high schools is as follows:

Four senior high schools built between the years 1898 and 1910 have ceiling heights of 10 ft. 8 in. minimum, and 11 ft. 0 in. maximum. Five built between the years 1910 and 1930 have minimum heights of 12 ft. 10 in., and maximum of 13 ft. 9 in. Of the two built in the 1930's, one has a 12 ft. 6 in. ceiling, while the other has a height of 15 ft. 8 in. However, this latter has a sloping roof, and at the lowest point is 14 ft. 8 in.

In the four junior high schools, all built between the years 1925 and 1935, the ceiling heights are as follows:

In the first two built, the heights are the same — 12 ft. 0 in. In the other two, built some time later, the heights were found to be 14 ft. 6 in. It may be interesting to note that in the latter two junior high and the two senior high schools, built in approximately the same period, the ceiling heights are relatively the same — over 14 ft.

On the basis of the survey, it may be assumed that ceiling heights for school shops should preferably be 14 ft. 8 in.; the minimum in either case should not be less than 12 ft. 8 in. The 12 ft. 8 in. should provide sufficient clearance for the storage of 12-ft. lumber, where vertical storage is required or desired, and for most materials that come into the shop. However, it still is the writer's opinion that 14 ft. 8 in. would be preferable. This height should also provide for the dissipation of many noises without rebounding vibrations. If finances will permit, acoustical treatment of the ceiling is very desirable.

OMISSION

Teaching Aid for Proper Handling of the Flat Foot Rule, which appeared in the May issue of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION MAGAZINE, should have been credited to George Benning, a senior in the Department of Industrial Arts at North Carolina State College, Raleigh, N. C.

We thank Ivan Hostetler, head, Department of Industrial Arts at North Carolina State College, for calling our attention to our error.

— Photograph submitted by Benjamin J. Novak

Print shop at Dobbins Vocational-Technical School, Philadelphia, Pa.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

JOHN J. METZ, Editor

MAKE 1953 A SAFER YEAR

The Safety director of the Association of Casualty and Surety Companies, John V. Grimaldi, at a meeting of the Central New York Chapter of the American Society of Safety Engineers, voiced the opinion that the reduction in frequency and severity of plant accidents over the past four decades has been due almost entirely to the efforts of management, co-operating with insurance company safety engineers.

Of course, the number of workers in dangerous occupations has been greatly increased. There are many more vocational and technical schools, and much more dangerous machinery has been used during the past forty years. Then too, many more machines have been perfected which help to do man's work. These machines work much faster than man but they do not think. The so-called unskilled laborer is put to work attending to them, with practically no instruction on how to attend them safely. The worker is let loose on a job simple as it may be, without indoctrination, and what he learns about safety on the job is what he acquires the hard way.

Nothing is gained, however, by arguing whether management, the insurance companies, or vocational education has brought about the betterment. Unfortunately, too many accidents are still happening, and every agency — the employer, the unions, trainers of apprentices, and school-shop instructors — should do its utmost to emphasize safety to the highest degree.

HO FOR THE FIRST DAY OF SCHOOL

So the 1953–54 school year is about to start. Some shop teachers are looking forward to the opening date with pleasurable expectation; others, especially beginning teachers, with hopeful anticipation; while still others look forward with ill-concealed feelings of boredom.

To what class do you belong? The writer hopes that it is the first or second. Anyone going to the teaching of his industrial arts and vocational education classes without a real feeling of gladness ought to reconsider whether he should teach at all. Men with skills such as a good school shop teacher should have are still greatly in demand by industrial firms and probably disgruntled or dissatisfied teachers will find greater satisfactions in factories where production work is carried on.

The youth of our land is too valuable to be entrusted to men who are not willing to spend their every effort in doing a real job in their classes so that their students can get a full understanding of what is expected of them in the agricultural, commercial, and industrial life of our age.

As with every other job, teaching has its difficult, annoying, and disappointing moments, but the teacher who loves teaching, his subject, and young people, will find that it has many remunerations which far outweigh what most other employment can offer.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION hopes that the new school year will give you and your students all you hope to get from it. If that is the case, then whether you are a beginning teacher, or one that is about to retire, you will experience the satisfaction of having spent another year of worthwhile endeavor when June, 1954, arrives.

HOW ONE TEACHER IS SPENDING HIS RETIREMENT

Emil F. Kronquist, who taught artistic metalwork at the Milwaukee Vocational and Adult Schools, retired in 1951 after having taught for almost 25 years. Mr. Kronquist is one of these happy individuals who love their work enough to also make it their hobby.

Upon retiring, he made a nine-month trip to Europe, spending about half of his time in his native Denmark and the Scandinavian countries. The rest of his time was spent in traveling through England, France, and Italy.

In Denmark he visited his two brothers, and celebrated the 100th birthday of his father with the family. He also visited the famous Jensen establishment in Copenhagen that had been founded by the late George Jensen who had served his apprenticeship under the same craftsman as did Kronquist many years ago. He found many acquaintances among the four hundred gold- and silversmiths working there.

It is interesting that after he had served his five-year apprenticeship in gold- and silversmithing he received permission to apply for membership in the Danish Gold and Silversmiths' Guild, and also won a scholarship which made it possible for him to attend evening school in London while working during the daytime.

Then he read about the World's Fair to be held in St. Louis in 1904 and at once made plans to attend it. He found a chance to work at his craft in Chicago, and after about a year he got a chance to satisfy his ambition to teach. He spent six years teaching manual training in Oklahoma, five of which were spent at the State Teachers College. Then he went to Milwaukee and taught at the Milwaukee Vocational School.

He is the coauthor of several books of mechanical drawing, and is the sole author of a book titled *Art Metal Work*. *Metal Crafts and Jewelry* is another book at which he is working now.

The foregoing gives one a very good idea of how much Mr. Kronquist crowded into his life while he was teaching — and now that he has retired, what is he doing?

One room at his house is fitted up as a workroom, and the arrangement would gladden the heart of any craftsman. He finds much joy here working at art metal work with the many tools most of which he made.

Because he is living alone, he was asked what would happen to all of these things after he passed on. With the customary quaint smile on his face he said: "The tools will go to two girls' colleges here in Milwaukee, where they can be put to good use by the students in the occupational therapy classes. The examples of the work of gold- and silversmiths that I have gathered will be turned over to the Milwaukee Public Museum where they may inspire others so that fine artistic hand work may not become a lost art."

Mr. Kronquist has filled his life and the life of others with beauty. May he continue to a ripe old age enjoying his hobbies and giving others pleasure.

PROBLEMS AND PROJECTS

PLASTIC DESK-PEN SET

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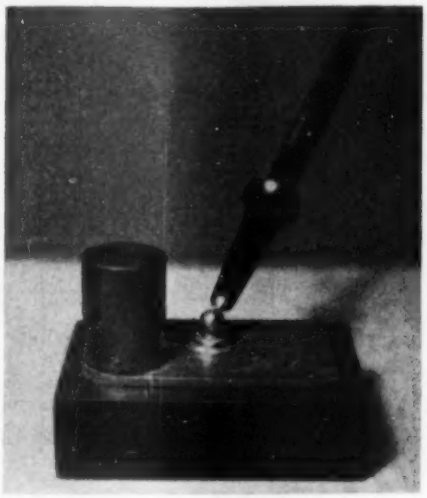
The plastic desk-pen set shown here is quite simple in design, yet it offers a number of student experiences which should prove both interesting and challenging. Experiences gained from the development of such practical projects will be deeper and more lasting.

The base for the set is made of three pieces of plastic. The ½-in. separating strip of plastic should be made of stock of a contrasting color. A strip separating black strips makes a pleasing and handsome combination. The cylindrical shape at the top of the base was introduced merely to give some elementary experiences with the metal lathe, but it does much to improve the appearance of the set. The student who must justify the use of a material by its practical application can easily turn the cylinder into a container for pen points.



Plastic desk-pen set

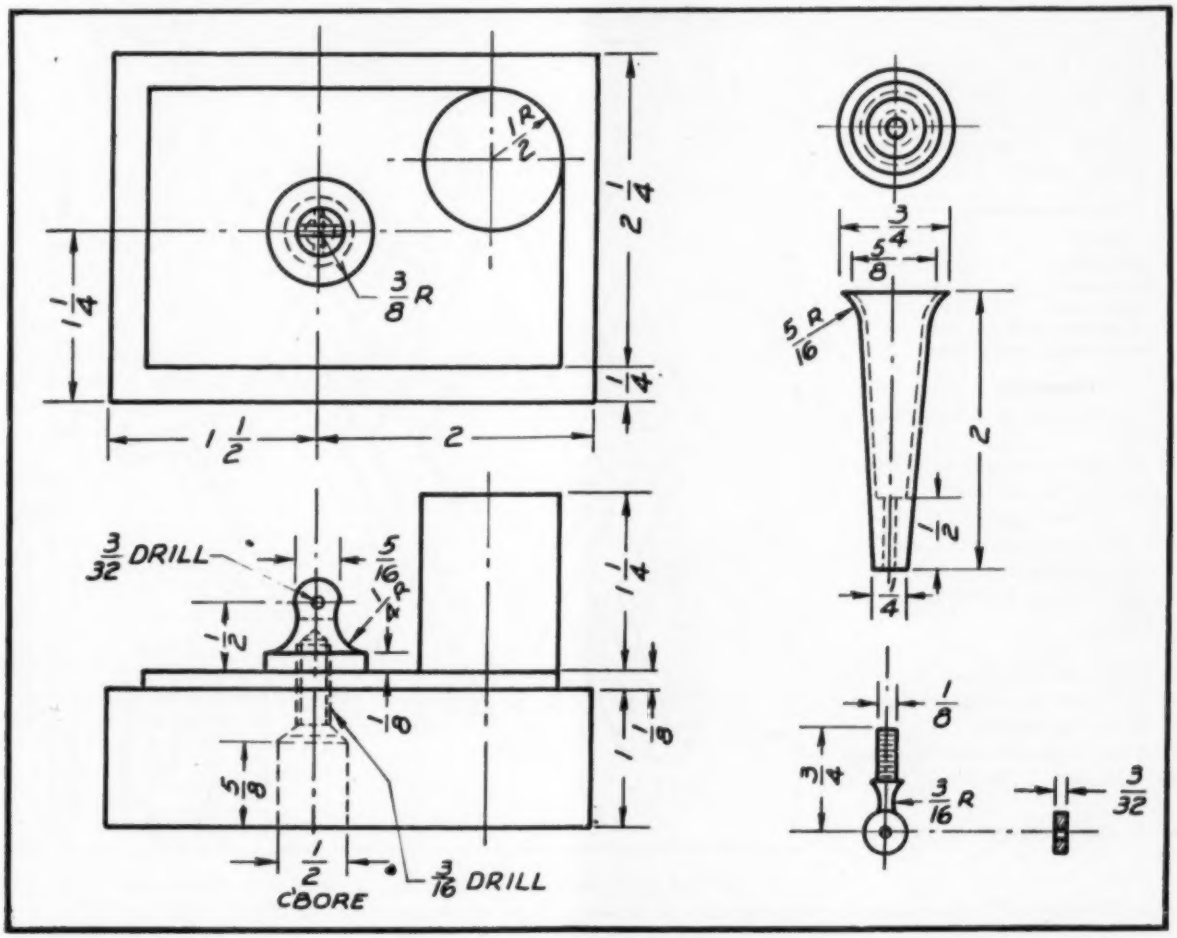
A pen holder may be purchased or turned on the metal lathe.

MATERIALS TO BE USED

Number	*Material*	*Name*	*Dimensions*
1	Plastic	Base	1 x 2½ x 3½ in.
1	Plastic	Base	⅛ x 2 x 3 in.
1	Plastic	Base	1 x 1 x 2 in.
1	Plastic	Pen holder	¾ x ¾ x 2½ in.
1	Brass	Pen holder	¾ x 2 in. Rod

Procedure

1. Lay out and cut plastic stock to dimensions.
2. Plane and/or file edges of flat stock.
3. Sand edges (finish with Wet-Dry 400A paper).



Plastic desk-pen set

4. Buff with cloth buffer.

5. Lay out, mark, center punch, and drill hole for pen holder fastening screw; counterbore from bottom of base to fit the head of the fastening screw.

6. Turn plastic cylinder, face top of cylinder and polish.

7. Cement parts of base together.

8. Turn brass units for pen holder. (The two pieces are to be turned from the given pieces of stock.)

9. Cut slot and drill base for pen holder.

10. Thread unit to be attached to plastic body of holder.

11. Turn plastic holder, drill, ream, and polish.

12. Tap plastic holder for brass unit.

13. Fit units of holder together. (Rivet top to base.)

14. Mount completed pen holder onto base.

15. Polish entire set.

BREADBOARD PLANTER

STANLEY A. GLOW
and
CARL S. GASSEN
Evanston Township High School
Evanston, Ill.

The planter described here has proved to be both interesting and of educational value to general shop students. When finished it is attractive and utilitarian. A number of good operations in wood and sheet metal are incorporated in the project.

BILL OF MATERIALS

No. of pcs.	*Material*	*Size*
1	White pine	¾ x 8 x 14 in.
2	White pine	¾ x 3¼ x 7 in.
1	Fir plywood	¼ x 6 x 9 in.
6	4*d*. finishing nails and glue	
	Stain, shellac, varnish, wax	

Procedure

1. Select the material as indicated on the bill of material.

2. Make the necessary templates for the top and legs as shown in the drawing.

NOTE: Use the grid method for enlarging the pattern. Any design can be used as long as the over-all dimensions are maintained.

3. Make all necessary layouts as indicated in the drawing.

Top

1. Drill a hole near any corner in the top piece and insert the jig-saw or coping saw blade and cut out the center.

2. Cut out the handle and round the corners.

3. Drill ¼-in. hole in the handle as indicated.

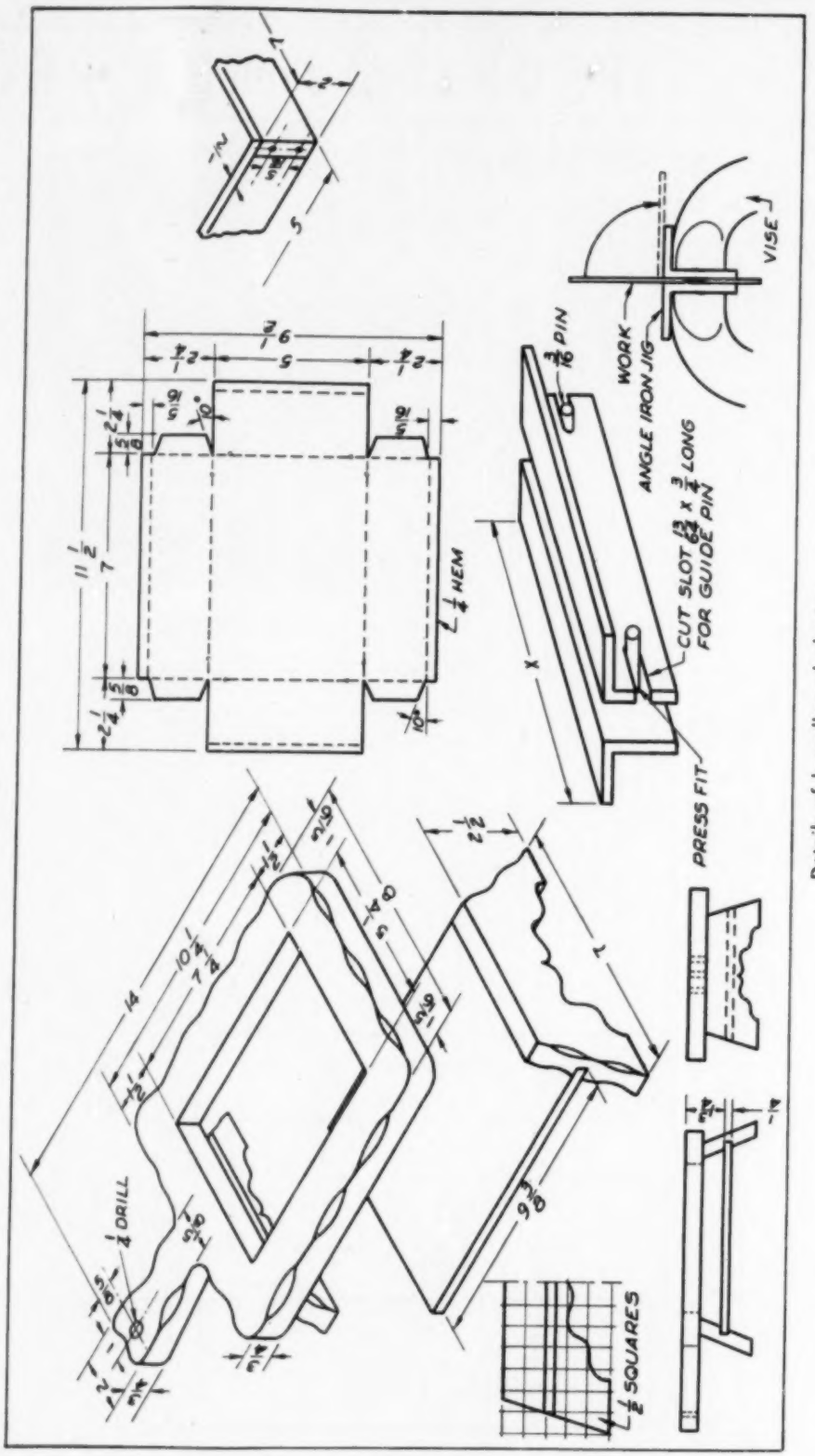
4. Smooth with sandpaper to remove all sharp edges.

Legs

1. Tilt the table saw to 20 degrees, and set the fence 3¼ in. from the blade and rip. Turn stock over and run it through again to make the edges parallel as shown in the sketch.

2. Set the table saw blade to ¼ in., keeping it tilted at 20 degrees and cut the ¼-in. slot for the shelf.

3. Transfer the design to the leg pieces and



Details of breadboard planter

Breadboard planter

cut to shape, using the jig saw or coping saw.

4. Smooth all edges and cut or file the notches along the outer edge as on the top piece.

Assembly

1. Check all pieces for smoothness.
2. Place glue in leg slots, and insert shelf.
3. Locate and drill holes for the 4*d*. nails to be used for fastening the top to the legs.

NOTE: The hole should be drilled at the same angle that the legs tilt (20°).

4. Set the nails and fill.

Finishing

The finish can be any color stain desired. Allow to dry and shellac or varnish, followed with an application of hard wax.

Bill of Material for Box

1 pc. 30 ga. galv. iron 9½ by 11½ in.
8 – 16 oz. flat head tinned tinner's rivets.
Solder, flux.

Procedure to Make Planter Box

1. Select material as indicated on bill of material.
2. Lay out box as shown in stretchout.
3. Cut out box using straight blade snips.
4. Turn ¼-in. hemmed edges to side opposite layout lines.

NOTE: If a bar folder is not available a simple angle iron jig, as shown below, may be made for turning hems and forming 90-degree bends in sheet metal. Pins may be fastened near the ends of one angle and slots cut in the other to hold the upper edges in alignment.

5. Form the 90-degree bends across the tab ends (⅝-in. riveting allowance).
6. Clamp a block of hardwood in place and bend the 7-in. sides. Part of the tabs will fit under the hemmed edges.
7. Place a lead block on a solid surface and punch ⅛-in. holes through the tabs and box for rivets.
8. Rivet the corners, placing the heads of the rivets inside the box.
9. Solder the corners. Most soldering fluxes cause corrosion unless completely removed. Scouring powder is effective in removing flux.
10. A finish of flat black enamel makes a striking contrast to the natural or stained wood finish.

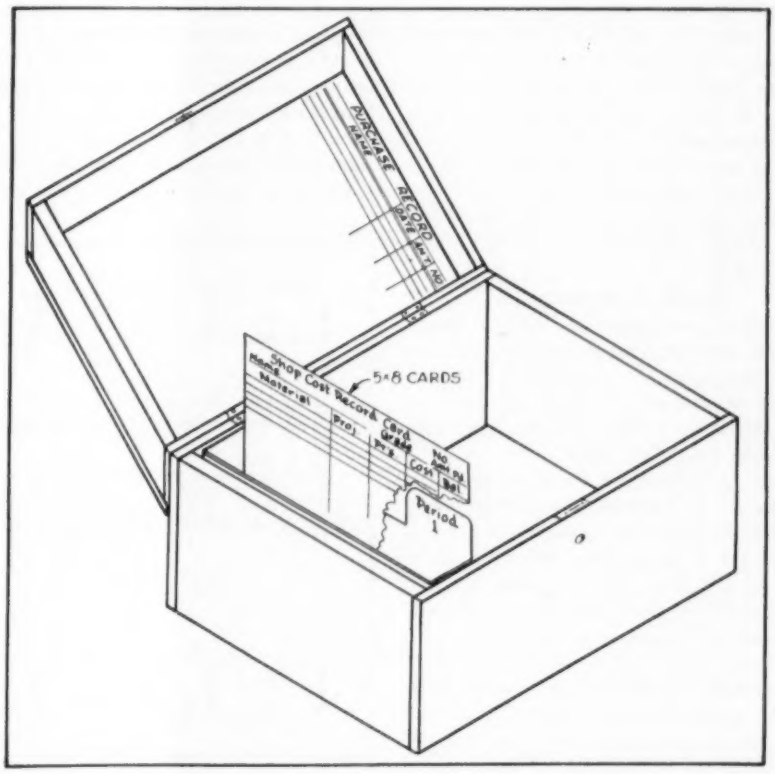
SIMPLIFIED RECORD SYSTEM

HARVEY GORDON
Industrial Arts Department
Jefferson School
Winona, Minn.

Keeping a running record of supplies issued, of projects made, and grades for each, sometimes leaves little time for the primary job of teaching.

While no plan is perfect, the system described here seems to possess definite advantages; it takes little time to supervise, and it is simple enough for shop officers of each grade, seven through nine, to operate.

Basic requirements for this setup are the 5 by 8-in. cards shown, the metal pockets to hold the cards for each class, and a hinged metal or wood box that can be locked up. The top of the box may be utilized to keep records of ticket sales and numbers of tickets as they are sold. Only one pocket need be removed for any class hour.



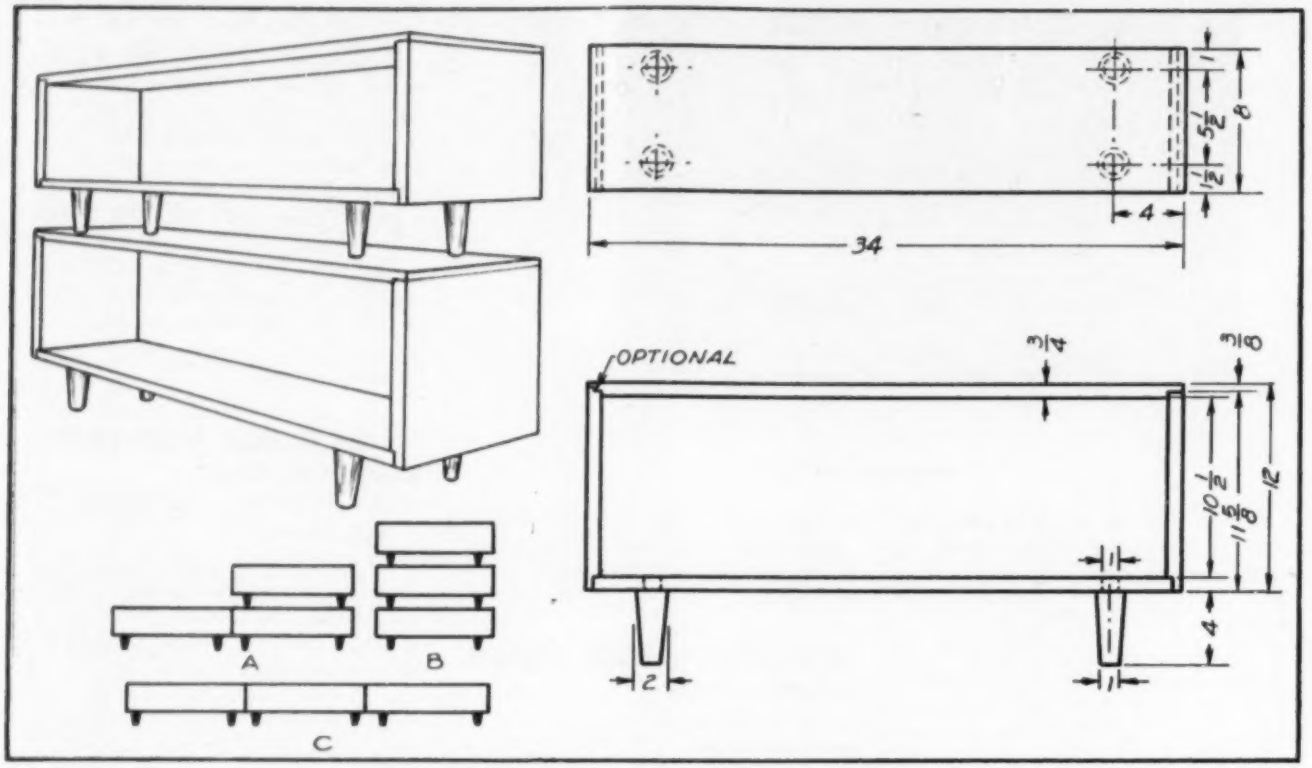
A simplified record system

SECTIONAL BOOKCASE

KENNETH R. FECHTER
Alexander Ramsey Junior-Senior High School
St. Paul, Minn.

Professional furniture designers sometimes use methods of construction which cannot be adapted to shop use. Molded wood parts, for example, are almost out of the question. There are, however, many methods and designs which shop teachers can put to good use in the construction of contemporary furniture.

Contemporary designs can usually be put together in less time and with less material than period designs. They are clean and sim-



Details and assembly of sectional bookcase

ple, and free of extra frills. There is less waste which means more project for our inflated dollar. This project is particularly good because of its flexibility. It can be shifted to various parts of the room in several arrangements. It may be stacked for narrow spaces, and placed end to end for long low spaces, such as under windows, or in other combinations. (See arrangements at *A*, *B*, and *C*.) If the shelves are stacked the space between may be used for a knickknack or two, or perhaps an ash tray.

Details of Construction

Any kind of wood may be used. It is recommended, however, that the natural finish be used. That is, if pine or maple, or any light-colored wood is used, it should be finished as such, and if the builder prefers a dark finish, he should use a dark wood.

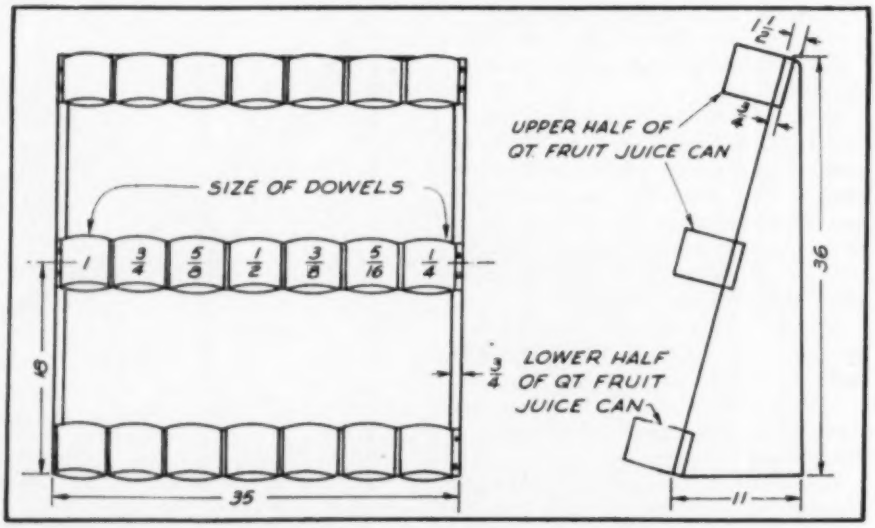
There is no back, so therefore, the joints will have to be good and strong. If the builder feels the suggested joints are not strong enough for the wood being used, wood screws may be used and plugs cut from matching wood to fill the holes. Two joints have been suggested in the drawing. The rabbet joint should be used at the top by the less experienced students, and the combination miter by the more advanced students. The rabbet joint should be used on the bottom shelf for it is strong and no end grain will show. Screws may be used here without plugs.

The legs are turned a straight taper down to 1 in. A 1-in. hole is drilled in the bottoms at the places marked on the drawing, taking care not to split out. As the bill of material shows, the legs are made $\frac{1}{16}$ in. too long which allows the leg to project by that amount. It is then finished flat after the glue sets. If a light-colored wood is used the legs may be painted with a black enamel to offer a contrast.

A USEFUL DOWEL RACK

GARTH E. WILCOX
Tomahawk Vocational School
Tomahawk, Wis.

Adequate storage space is one of the problems that all industrial-arts instructors face. Storing dowels was a problem for me until I made the dowel storage rack described here-



Details of the dowel storage rack

with. This rack has several advantages: (1) it is very simple and economical to build; (2) it takes up very little space; (3) many different sizes of dowels may be stocked; (4) it is easy to select the size desired and still keep the dowels arranged neatly.

The dimensions given can easily be modified to suit the needs of the individual shop. I used the upper half of one quart fruit juice cans for the two upper rows, and the bottoms of the cans for the lower row. The cans are fastened on with screws or small bolts. Paint the rack to match the color scheme in your shop.

The total oil energy used in farming is about 750 million horsepower, which is more than that used by all other American industries. — *Petroleum Newsnotes.*

TOY ELECTRIC MOTOR

IVAN H. MOWRY
Shop Instructor
Jenkins Junior High School
Spartanburg, S. C.

When operated on six volts, the motor described herewith, will develop a surprising amount of power. Various means for easy adjustment have been provided, permitting the space between the armature and field to be lessened, thereby increasing the power. The new and simple construction of the commutator and armature core makes this motor an easy one to make.

Armature

Shaft core — use 3/32-in. welding or drill rod.

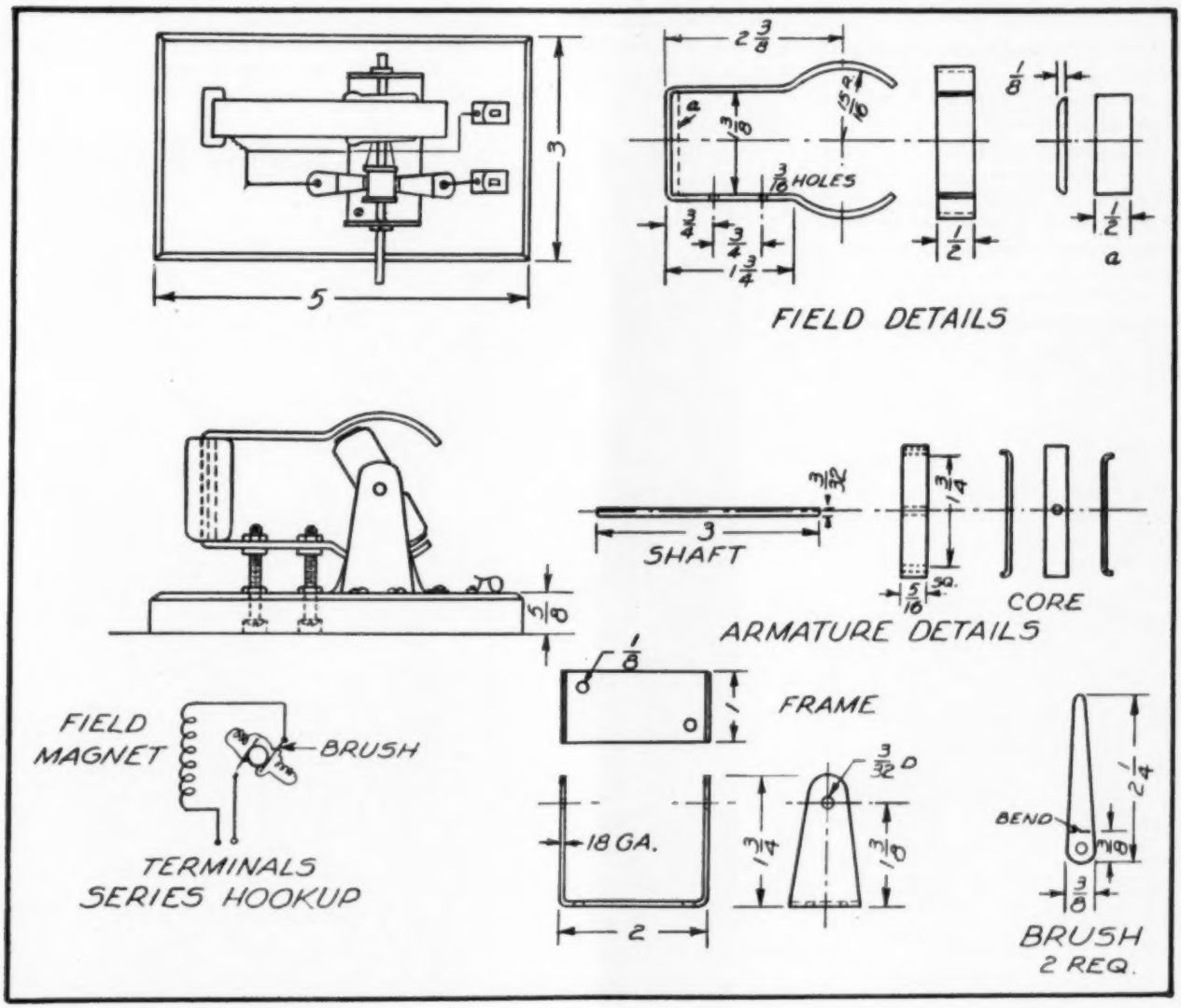
1. Use 5/16-in. square rod 1¾ in. long.
2. Balance to find center and drill 3/32-in. hole.
3. Locate core in correct position on shaft.
4. Prick punch to fasten core on shaft.
5. To make coil holders, cut two pieces from thin gauge metal 5/16 in. wide and 2 in. long; bend to length and cut off.
6. Place Scotch tape or thin paper over core; this is to help hold the coil holders in place and for insulation.
7. Using No. 24 wire, place 100 turns on each pole and shellac each layer.

Armature Frame

1. Make frame of 18-ga. sheet iron.
2. Form as shown.
3. To locate holes, place piece on a flat surface, measure up 1⅛ in. on each arm, on the center line, and mark with the prick punch.
4. Drill 3/32-in. hole for shaft.

Field

1. Cut piece of band iron ⅛ by ½ by 10 in.



Toy electric motor

2. Form as shown.

3. The corners must be sharp; if not, place arms in vise and with the hammer form the corners at right angles.

4. Cut off surplus metal on ends with hack saw.

5. Drill 5/16-in. holes on one arm as shown.

6. Cut piece *a* from same bar long enough so it will just fit between the two arms and must fit snuggly against back; file ends if necessary.

7. Place Scotch tape or thin paper over core; this is to help hold the extra core piece in place and also for insulation.

8. Using No. 24 wire, place 200 turns on the core and shellac each layer.

Commutator

1. Cut a piece of sheet copper ½ in. wide and long enough so its ends just meet when formed around a ¾-in. dowel.

2. Remove and cut the piece in half, being careful not to distort it.

3. After the armature has been wound place it in its frame.

4. Tear off a strip of friction tape ½ in. wide and about 3 in. long.

5. Wind this tape around the shaft. Keep it tight and build it up large enough so that when the two pieces of copper are placed over it there will be about 1/32 in. between the ends.

6. Form pieces and fasten the sides farthest from the armature with a narrow strip of tape, wound around several times.

7. Solder the wires from the armature poles — one to each piece of copper, being careful not to overheat the pieces and do not let solder extend more than 1/8 in. from the edges.

8. Wrap another narrow strip of tape over these edges.

Brushes

1. Cut brushes out of 24-ga. sheet spring copper.

2. Form as shown.

Assembly

1. Make base as shown.

2. Center armature frame 1 in. from one end of base and fasten down with screws.

3. Center armature shaft in frame, armature being not less than ¼ in. from frame.

4. Solder washers on each end of shaft to hold it in place.

5. Center field over armature and mark holes on base for the bolts.

6. Drill and countersink holes in base. Countersink bolt holes deep enough so bolts extend ¾ in. above top surface of base, using 1¼-in. bolts.

7. Set up frame and adjust.

8. Adjust and fasten down brushes.

9. Fasten down clip post.

10. Solder wire to brushes and posts.

MINIATURE DROP LEAF TABLE

DAVID L. WATKINS
Industrial Arts Instructor
High School
Swarthmore, Pa.

Here is a miniature drop-leaf table that is very attractive and works very well as an occasional table. It can also be used as a card table by raising the leaves.

The first step in constructing the table is to cut the stock for the legs and turn them on the wood lathe.

After turning and sanding the legs, the next step is to plane the tops of the legs square. Then lay out and mortise for the rails, making sure the side rails of the table are flush with the inside of the legs.

After completing the legs, cut the rails of the table to size and cut the tenons on them to fit the mortises on the legs. As the tenons are fitted, mark them so that no mistakes are made in the gluing up process.

Sand all pieces thoroughly before the table is assembled. Then glue the rails to the legs making sure that everything is square in the final clamping process.

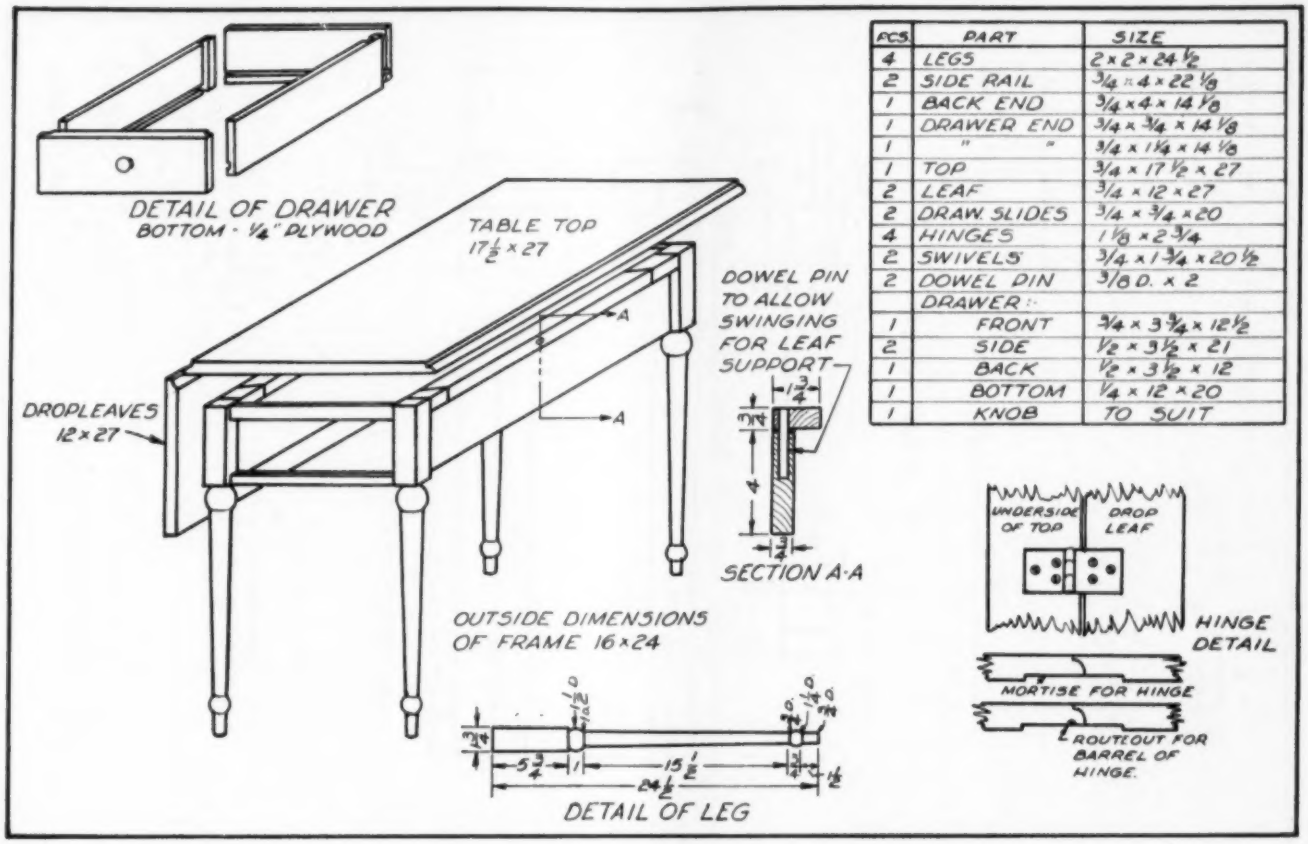
While the glue is setting, glue up the pieces for the top and drop leaves. After these are dry, cut the top and leaves to size, and plane and sand them. Then cut the edges of the table and leaves for the drop-leaf joint.

If a portable hand router is available, cut the top and leaves so that the joints fit correctly. Be sure to practice on scrap pieces of wood and be very careful to match your cuts before making the final cuts on the top and leaves.

Then mortise for the hinges and for the barrels of the hinges as shown in the detail drawing. You can do this by using a good sharp chisel, but the better and easier way is to use the hand router with a straight bit. For the barrel of the hinge, you can use a core box bit, or you might want to shape the groove by hand with a small gouge or a chisel used for carving.

Before fastening the top to the frame, you will want to fit the swinging pieces for the leaf supports. These are pivoted on a 3/8-in.

Small drop-leaf table



PCS	PART	SIZE
4	LEGS	2 x 2 x 24½
2	SIDE RAIL	¾ x 4 x 22⅛
1	BACK END	¾ x 4 x 14⅛
1	DRAWER END	¾ x ¾ x 14⅛
1	" "	¾ x 1¼ x 14⅛
1	TOP	¾ x 17½ x 27
2	LEAF	¾ x 12 x 27
2	DRAW. SLIDES	¾ x ¾ x 20
4	HINGES	1⅛ x 2¾
2	SWIVELS	¾ x 1¾ x 20½
2	DOWEL PIN	⅜ D. x 2
	DRAWER:	
1	FRONT	¾ x 3¾ x 12½
2	SIDE	½ x 3½ x 21
1	BACK	½ x 3½ x 12
1	BOTTOM	¼ x 12 x 20
1	KNOB	TO SUIT

Details of small drop-leaf table

dowel and the ends are cut on a 45-deg. angle so that they will swing in the same direction and not interfere with each other.

The top is fastened to the frame of the table with ¾-in. square boards which are in turn fastened to the end rails with No. 8, 1¼ flat head wood screws.

The table is given a complete sanding with 2/0 sandpaper to remove any previous sanding marks and to make it perfectly smooth for the finish.

The drawer is made to fit as illustrated, and the knob is turned on the lathe from a piece of wood from one of the legs. Knobs of this kind can also be bought in the open market.

You can use any finish you desire, but I wanted a natural finish, so to bring out the grain I used boiled linseed oil and turpentine mixed in equal proportions. One coat of shellac rubbed down with 6/0 sandpaper, and a final coat of rubbing wax, gave the table a fine polish.

MODELS OF HISTORIC CANNONS

JOHN EMMEL
Connelley Vocational High School
Pittsburgh, Pa.

Some years ago, while conducting a general shop, I used the following models as projects to stimulate interest in craftsmanship.

I made some of the models myself, put

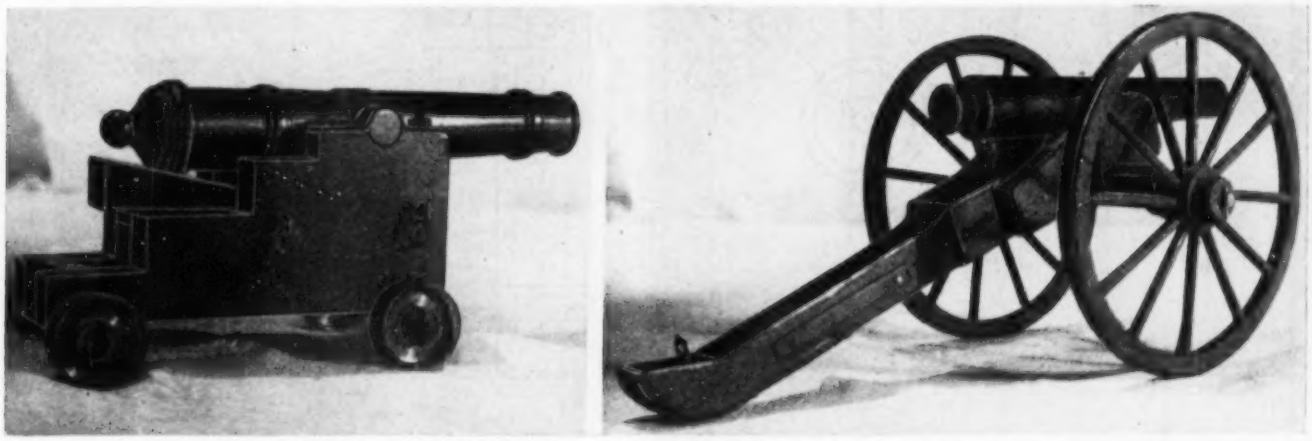


Fig. 1. Models of historical cannons

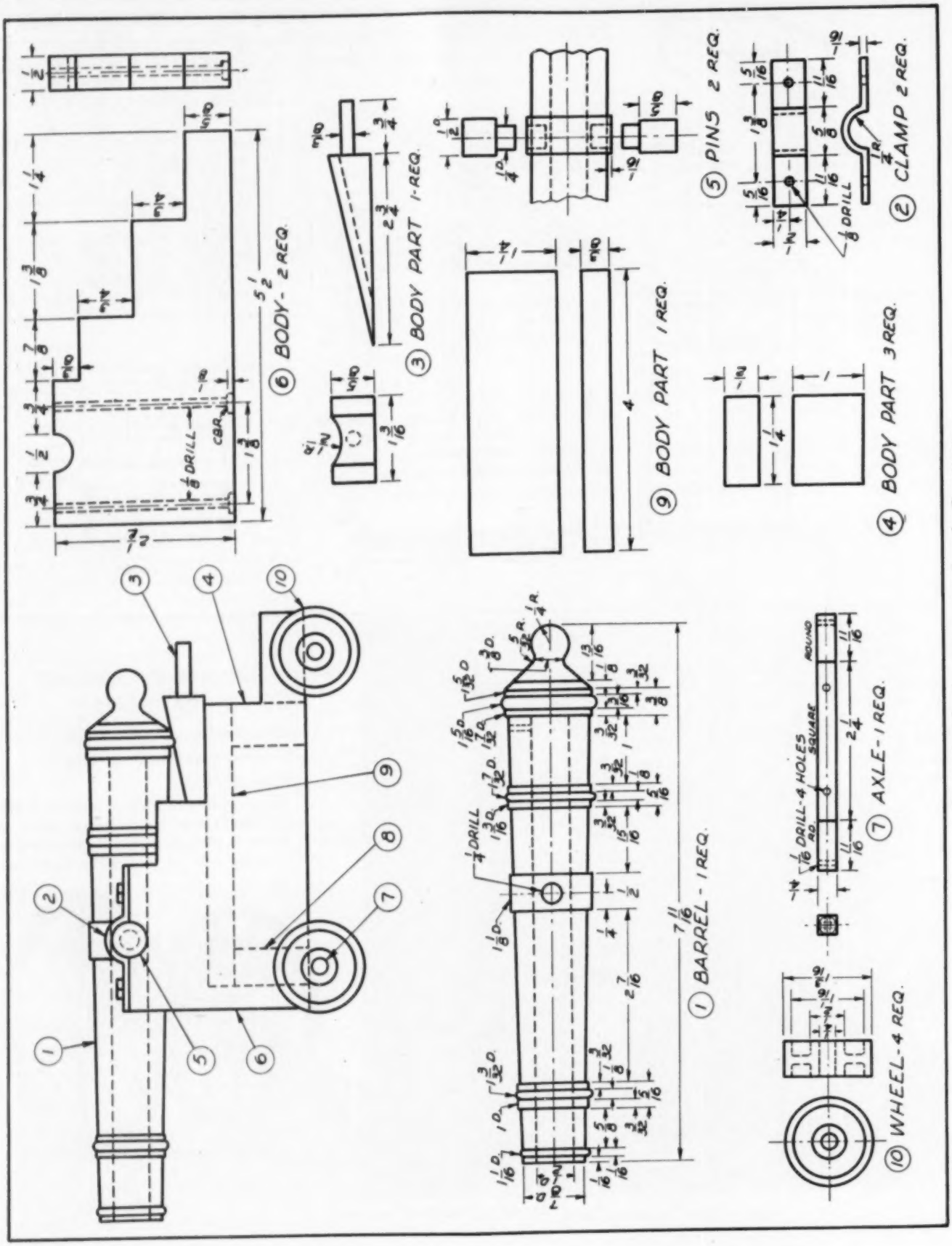


Fig. 2. Details of naval gun used on the Constitution

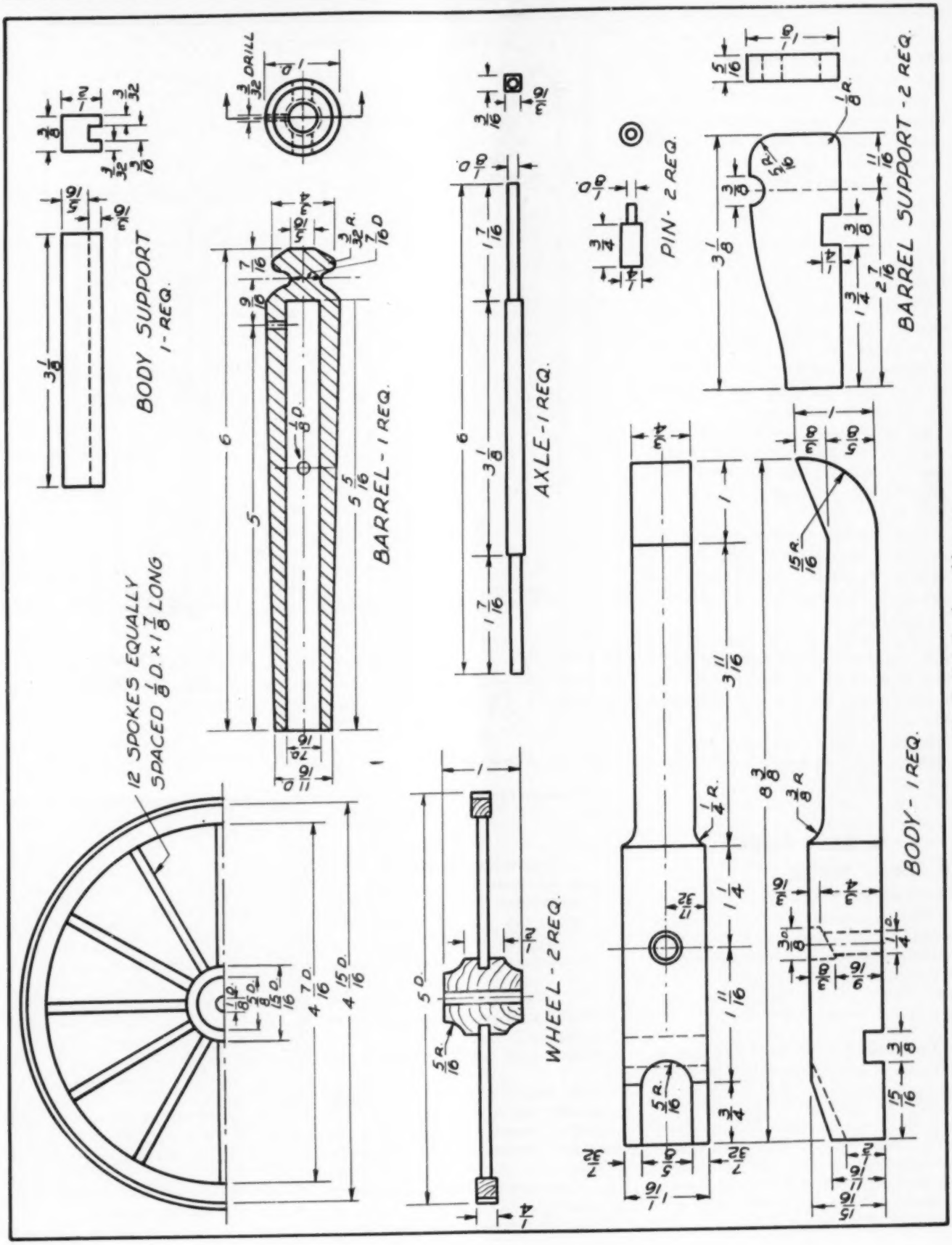

BODY SUPPORT
1 - REQ.
BARREL - 1 REQ.
AXLE - 1 REQ.
PIN - 2 REQ.
BARREL SUPPORT - 2 REQ.
12 SPOKES EQUALLY
SPACED 1/8 D. x 1 7/8 LONG
WHEEL - 2 REQ.
BODY - 1 REQ.

Fig. 3. Details of an old cannon

them on display, and then offered to help anyone make a similar model after he had done the minimum of required jobs with good grades.

The response was universal. The boys really worked, and were so busy they did not bother much with the usual boyish *horseplay* that occasionally takes place in shops.

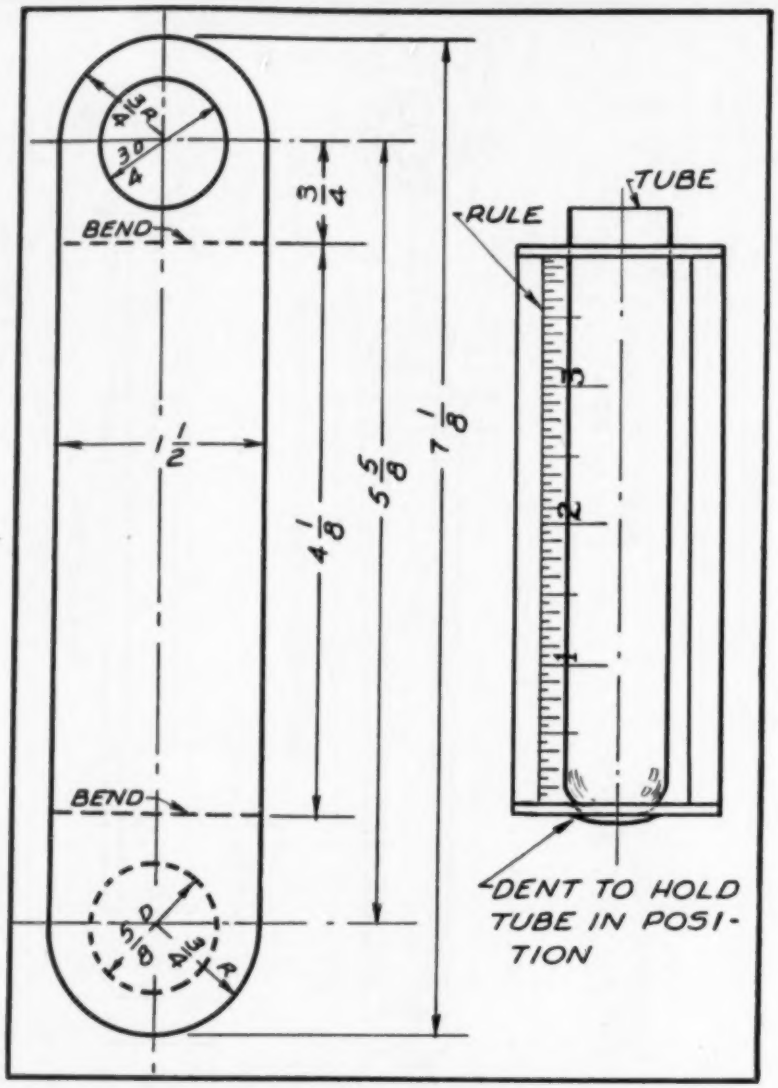
The boys learned a little more, did a great deal more, and I had a very pleasant shop atmosphere of busy industry. These two projects are typical of some that were very popular then, in the days before Fisher Body Guilds and scale model stores.

The naval gun model in Figure 1 is a copy, although not to scale, of the guns on the "Constitution." Some simplification for ease of making has been done, but it presents a novel picture of something from a departed era. For details see Figure 2.

The model cannon also shown in Figure 1 is a replica of the type found at the Gettysburg National Park. The cannon was photographed — front, rear, and side view pictures being taken.

These negatives were then projected and enlarged until the wheels were 5 in. in diameter. This procedure maintained the true proportions and dimensions were scaled from the enlargements.

The pieces are all very simple. Lollipop sticks were used as spokes. A No. 8-32 fillister head screw and nut was used for an elevating screw, and small pieces of ¼ in. wide, black iron took the place of the reinforcing. The wheel rim is sawed out of plywood and a black iron band was placed around it. For details see Figure 3.



Details of the rain gauge

A RAIN GAUGE

O. ARNOLD RADTKE
Oconomowoc, Wis.

The rain gauge described herein is similar to the one I have been using. It has aroused considerable interest. Many would come to me to read it or inquire about the rainfall very soon after a rain. I have checked mine with the weather bureau reports and found they were within about 1/32 in. One rain which was reported officially at 3.47 in., was recorded by my gauge at 3 7/16 in. Another recorded at 4.25 in., showed up on my gauge at 4 5/16 in. Because of the round bottom of the tube I use, it is difficult to get the first ⅛ in. very accurately. Glass cigar containers, tooth brush tubes, and test tubes also may be used. Size or diameter do not matter except that the dimensions of the metal holder need to be changed to fit the tube.

MATERIALS REQUIRED

No. of pcs.	*Material*	*Size*
1	Aluminum	2 by 8 in. of almost any gauge
1	Glass or plastic tube	⅞ x 5 in.
1	Plastic rule	6 in. long
1	Board	¾ x 1¾ x 5 in.

Procedure

1. Make a layout of the aluminum holder as per diagram.

2. Center punch and drill hole to about ½ in.

3. Ream hole to fit tube so it can be removed easily (top only).

4. Indent depression at bottom with the ball end of hammer so tube will remain stationary.

5. Cut rule to fit between the bottom and top supports.

6. Bend the two ends on the line.

7. Before gluing the rule or gauge in place make a test for accuracy. You do this by placing the tube in the gauge and filling to the 2-in. level. Pour out 1 in. carefully measuring into a second container. Now empty the remaining water. Pour back the measured inch and if correction is needed, file off a small portion from bottom of rule; or increase the dent at the bottom allowing the tube to protrude a small amount so that the measured inch comes to the 1-in. mark on the rule. Now fasten the rule firmly in place with Dupont cement or any weatherproof cement. If accuracy for the first ⅛ in. is desired it will be necessary to cut away at least the first 1/16 or a little more to compensate for the shape of the bottom of the tube. I prefer sacrificing the first ⅛ in., as it makes it easier to get the balance of the gauge accurate.

NOTE: The top of the tube must protrude

above the top of the support and the board onto which the gauge is fastened. Also, the gauge must be placed in an open space not under trees, bushes, or an overhang on a building; otherwise, you cannot get a correct check, or reading.

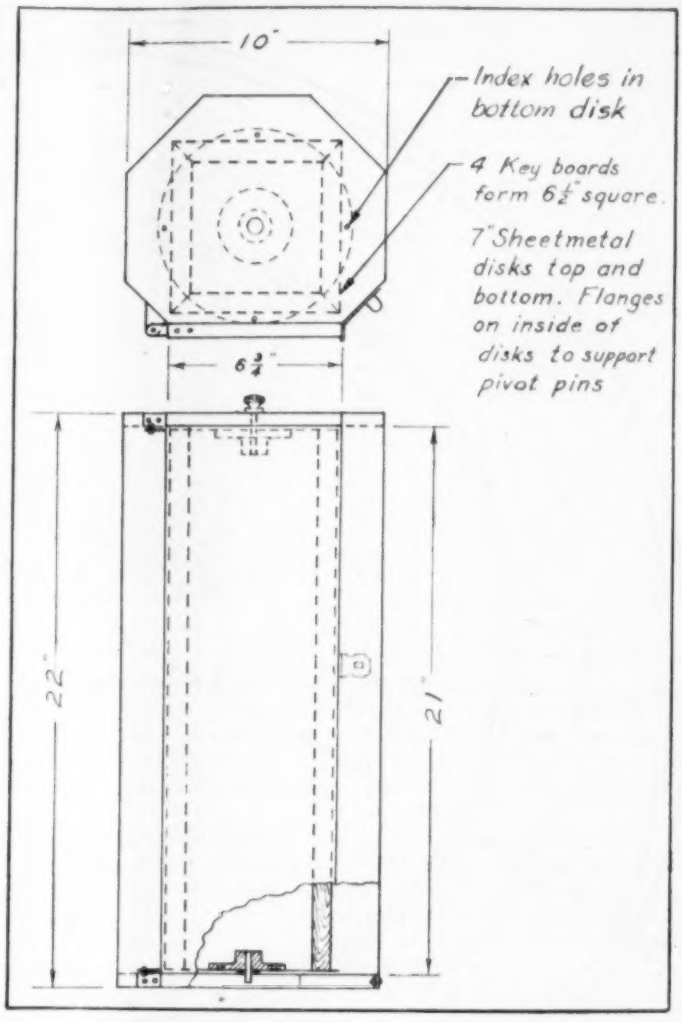
As a suggestion for those wishing a more accurate reading on the lower part of the scale I suggest filling the tube with wax and making the lower bend enough to allow for a level bottom.

Boy scouts and girl scouts may find this a most interesting and instructive project. It is simple in construction and the materials are easily obtainable at very little cost. Science classes may also find this useful and instructive in some of their class studies.

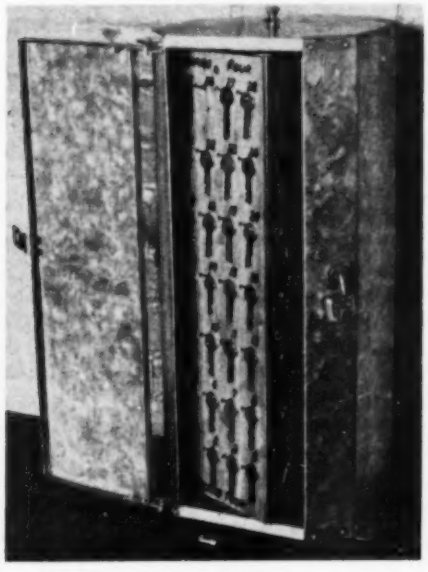
KEY CABINET WITH ROTATING PANELS

C. S. ALLEN
Deering High School
Portland, Me.

With about 100 pupils enrolled in the 4 periods of drafting at Deering High School, the control of keys to the individual locker drawers is of some concern. Issuing keys to a limited number of pupils was tried, but with unsatisfactory results. Next we experimented with class keyboards on which all keys were placed. These boards necessitated a great deal of handling, since they had to be hung up for each class, and then stored in a drawer at the end of each class period. The idea of combining the boards was discussed with several responsible boys. After making a few sketches and a full-size layout, the rough plans were turned over to the general metals class.


10"
Index holes in bottom disk
4 Key boards form 6½" square.
7" Sheetmetal disks top and bottom. Flanges on inside of disks to support pivot pins
6¾"
22"
21"

Details of keyboard with rotating panels



Key cabinet

With a few minor changes they produced the cabinet shown herewith. The only reason for the octagonal shape was to conserve material and make use of narrow scrap pieces. It is assembled with roundhead machine screws.

The cabinet was built to satisfy the seating arrangement of our room, namely, 4 rows of 7 benches each. All benches have a general equipment drawer and 4 student locker drawers. It is unlikely that this arrangement would fit the needs of other schools. It is for this reason that no attempt is made in this article to explain the details of construction.

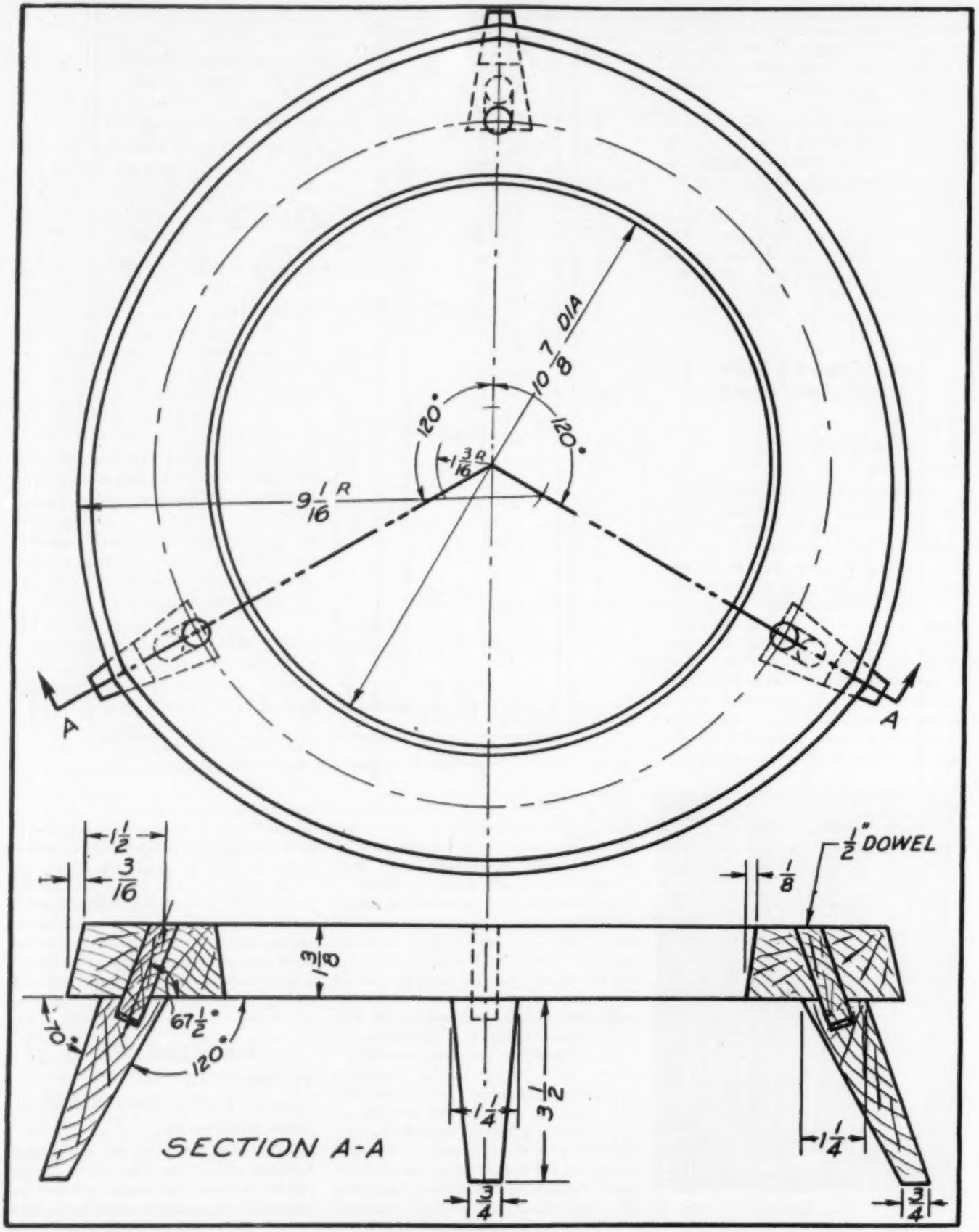
A word might be said about the operation of the cabinet. As each panel is turned into position, a pin is placed into the index hole. This holds the panel in place and discourages pupils from spinning the rotor. Tags are placed on the hooks representing spare benches so that at the end of the periods with one glance the panel may be checked. One quarter of a turn brings the next keys into position and this timesaving element is the all-important feature of the cabinet. The keys never leave the room, yet each student has protection for his drawings, pencils, etc.

The cabinet has been placed near the entrance to the room thus relieving congestion around the general tool panels and the drafting tape dispensing plate. It has been in use about a year and has served us well. Probably a similar rotating key cabinet may help you solve your key problem.

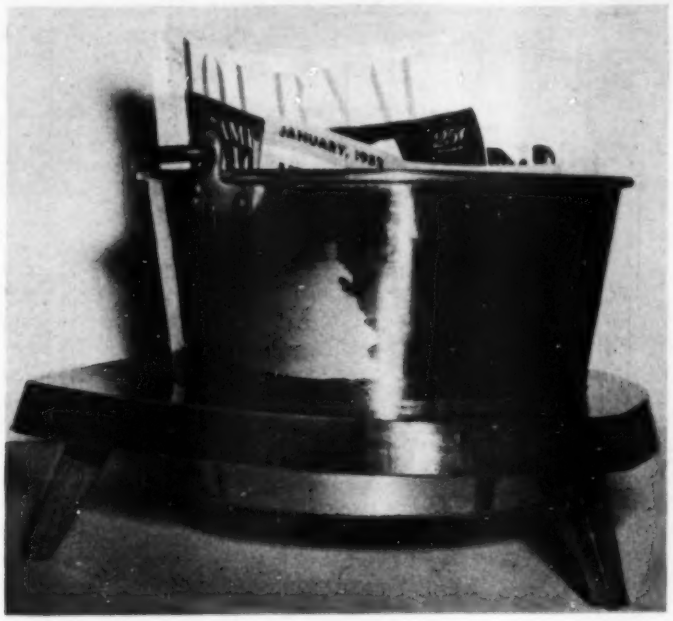
MAGAZINE STAND

RICHARD L. SWEITZER
Instructor, Frederick Sasscer High School
Upper Marlboro, Md.

Quite a few years ago the Pennsylvania Germans used a large brass kettle, like the one in the picture, for cooking purposes. Today many people use this same kettle for a



Details of magazine stand



A unique magazine rack

magazine rack. But the bottom of this kettle is curved or convex in shape and therefore it is necessary to build a stand for it so that it will sit flat on the floor without rocking.

This magazine stand is a project especially adapted for the junior high school student who is qualified to use the band saw. The project affords a valuable experience in cutting angles on the band saw and also is good for wood finishing experience.

The most difficult part of the project is to lay out the design of the stand. The complete circle should be divided into three equal parts and these lines extended completely across the wood. Next, mark off a point on each of these lines, 1 3/16 in. from the center toward the outer edge of the wood. These points are the ones used to scribe the arcs for the outer lines or edges of the stand.

BILL OF MATERIALS

No. of pcs.	*Name*	*Materials*	*Size*
1	Stand	Basswood	1⅛ x 18½ in.
3	Legs	Basswood	1¼ x 1¼ x 3½ in.
3	Dowels	Birch	½ dia. x 1¾ in.

Procedure

1. Make a drawing of the project.
2. Lay out the design on the wood.
3. Set the correct angle on the band saw and saw the outside bevel of the stand.
4. Drill a 1-in. hole in the inside circle to be removed.
5. Set the saw table level and saw through the stand into the hole which was drilled in the previous step.
6. With the band-saw blade in the hole, set the saw table at the correct angle to remove the inner circle.
7. Saw out the inside circle.
8. Glue the stand together at the place where it was sawed through in order to get the band-saw blade into the drilled hole.
9. Mark off the legs according to the dimensions given.
10. Saw out the legs on the band-saw.
11. Drill ½-in. holes at 67½ deg. angle in both the stand and the legs. These holes are for the dowel rods.
12. Glue dowel rods into legs.
13. Glue legs into stand. Smooth off dowel rods flush and even with the top of stand.
14. Thoroughly sand the legs and stand. Finish sanding with 2/0 paper.
15. Apply a coat of oil stain to the legs and stand. Wipe off the excess stain.
16. Allow stain to dry for 12 hours and then apply a coat of shellac.
17. Allow shellac to dry 6 hours and rub smooth with steel wool.
18. Apply either a shellac or varnish finish.
19. Apply a coat of wax.
20. Polish with a soft cloth.

PLASTIC WEBBING IN THE SCHOOL SHOP

JAMES P. KNOWLES
Teacher, Related Technical Subjects
School of Industrial Art
New York, N. Y.

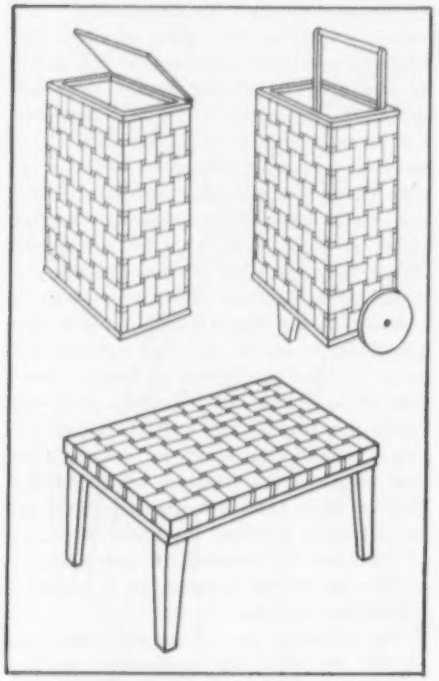
The introduction of new materials by industry is usually accompanied by a great deal of publicity intended to promote the sale of the product. Little of this can be used directly by a teacher. The objective is an appeal to the buying public and not to the education of either the public or students. Even when it is especially prepared for distribution to the schools it is generally a rehash of advertising copy. An effort has been made in this article to present the information about a new product in such a way that it will be of maximum use to an industrial-arts teacher. The list of projects is extensive enough to fulfill the requirements of nearly any industrial-arts shop not only in wood but in metals and including incidental areas such as electric wiring and simple mechanics such as the application of wheels. The suggested construction sequence begins with the visualization of the project graphically in several forms of representation from freehand perspective to working drawings. Following this is a sequence from materials lists to tools lists and finally construction schedules. Suggestions for the correlated and integrated instruction of related material follows. From these lists complete units can be developed fulfilling the needs of several of the areas of industrial-arts instruction including the related materials so necessary to meaningful teaching.

The following lists of projects have been divided into groupings based upon the type of furniture. Notation has been made of the suggested grade in which the project can be most easily and usefully taught. However, there is no reason for not teaching any particular project when the student is ready for it. In addition many of the projects may be made more or less difficult and educational by changing the types of joints or other construction details.

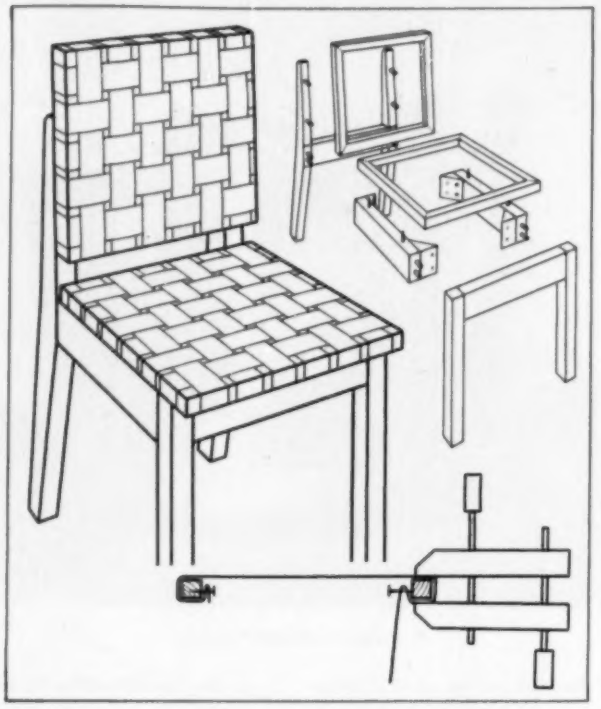
List of projects:

	Suggested Grade
A. Upholstered wood furniture	
1. Side chairs	11–12
2. Armchairs	11–12
3. Stools	10–11
4. Footstools	10–11
5. Benches	10–11
6. Outdoor chairs	11–12
7. Chaise longues	12
8. Hampers	11–12
9. Crib	11–12
B. Metal furniture	
1. Chairs	11–12
2. Outdoor chairs	11–12
3. Chaise longues	12
4. Swings	10–11
5. Benches	10–11
C. Decorative uses	
1. Lamp shades	10–11
2. Lamp bases	9–10
3. Picture frames	9–10
4. Radio speaker grilles	10–11
5. Cornice boxes	11–12
6. Folding screens	12
7. Cabinet doors	12
8. Bedheads	12
9. Coffee table tops	12
D. Miscellaneous	
1. Auto driver's backrest	9–10
2. Play pen	11–12

3. Market cart	11–12
4. Magazine rack	10–12
5. Picnic basket	11–12



Miscellaneous items on which Tufweb can be used



Chair, method of assembly, and applying webbing

The following suggested sequence for any project has been made to develop the fullest educational value. Visualization and design, scheduling and execution follow in normal continuity. Each step in the sequence can be developed by the teacher or better, co-operatively by the student and the teacher. Adapt the number of the steps executed by the students to their capacities as well as to the complexity of the steps. With proper research at each of the steps the whole project will flourish with educational values. Practically all of the research can be done by the students if enough reference material is available and they have been taught the necessary technique.

For instance the dimensions of a chair can be organized into a research project by having a student determine the factors.

Use of chair	Dining, lounging, outdoor, stacking
Seat height	Comfort of sitter's legs
Seat width	Support for the rump
Seat depth	Distribution of support
Back height	Support for whole or part of back
Angle of back	Comfort of sitter

Have the student check these factors using typical chairs found in the home. The family will generally co-operate as this approach to a construction project is obviously more exact than the usual one of depending upon visual impression and style consciousness.

When relatively fixed dimensions have been established, then the factors of design can be introduced. Methods of construction for maximum strength and finally finishing and decorating will clarify the basic essentials of a chair as well as indicate the many design solutions which have been made since man began to make furniture.

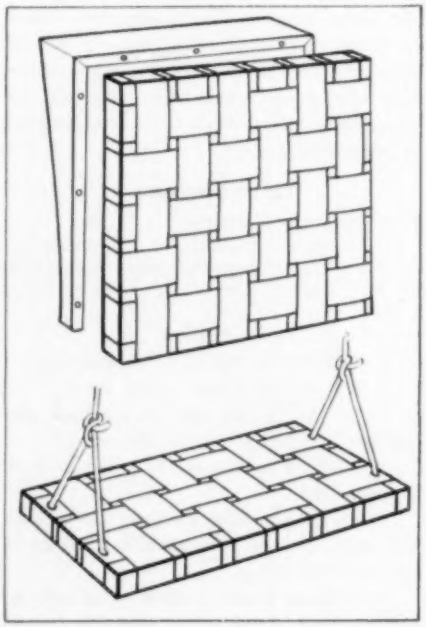
Construction Sequence

For convenience in regard to materials and equipment available in a school shop it is recommended that a project or limited choice of projects be suggested to the student. When a choice has been made the steps in the preliminary research should be outlined. A sequence such as the following will serve most situations and should not take more than one or two shop periods for its successful completion.

1. Use of the finished article
2. General dimensions
3. Materials available and most useful.
4. Design: (*a*) suitability, location in which it is to be used; (*b*) period, design copied or adapted from originals; (*c*) contemporary, functional, modular, or bizarre.

When this preliminary research is completed the student is ready to proceed with the following sequence. All of the parts of the outline can be used. Adapt it to the capacities of the individual student. Given an opportunity you may be astonished at the number of steps he may choose to do.

1. Drawing:
   a) Freehand drawing — elements of perspective as well as the knowledge of tools and skills. Study of the elements of design.
   b) Orthographic drawing — study of this method of representation, conception of three dimensional representation. Use of the scale.
   c) Working drawings — full size drawings



Backrest and swing

to study construction details. Use of the rule. Use of squares for enlarging or reducing.

2. Materials listing:
   a) Wood — stock list — standard stock listing procedures.
   — templates — templates can be made from the working drawings. Efficient use of stock and the effect of grain direction.
   b) Fastenings — nails, screws, tacks, bolts, etc.
   c) Webbing — length of each strip. Use of different colors. Total lengths for each color.
   d) Electrical — fixtures, wire.
   e) Finishing — stain, shellac or varnish, paint or enamel, rubbing materials, wax, etc.
   f) Supplementary — glass, metal edging, feet or domes, rope, etc.
3. Tools listing:
   a) Basic tools for carpentry work
   b) Machines — safety instruction
   c) Specialized tools for work other than carpentry
4. Schedule of work:
   a) Basic schedule — design, construction, finishing
      1) Design — copy, original, sketch, orthographic, working drawings.
      2) Construction — measuring stock, truing up stock, joints, assembling, gluing up and clamping, cleaning up, sanding or scraping
      3) Finishing — staining or painting, shellacking, sanding or steel wooling, polishing or rubbing
      4) Upholstering — marking in for strips, tacking strips, stretching and tacking, weaving and tacking
      5) Miscellaneous — attachment of hardware, installation of electric fixtures

Tufweb – What It Is

The plastic filament used to make Tufweb is Saran. Saran is a thermoplastic belonging to the Vinylidene Chloride group (*pronounced* vine-il-e-deen klor-ide). The basic raw materials of which it is made are brine and petroleum. The petroleum is cracked to make the gas ethylene and the gas chlorine is generated by electrolysis from the brine. The gases are combined to form trichloroethane which is then converted into vinylidene chloride, $CH_2 = CCL_2$.

By the addition of copolymers and control of the polymerization conditions a plastic with various properties can be made. Materials with softening points from 158° F. to about 350° and from flexible to hard are possible. The Saran extruded into the filament for weaving Tufweb is in the medium area. It will soften and can be changed in shape at about 270° F. Further information on the chemistry of the manufacturing process can be found in any comprehensive book on plastics published since 1941 as the Dow Chemical Company introduced it in 1940.

Properties

The properties are broken down into general and specific so that the subject can more readily be discussed on the various grade levels.

General:

Effect of weak acids — none
Effect of strong acids — darkens in sulfuric acid, others none
Effect of weak alkalies — none
Effect of strong alkalies — affected by ammonia, darkens in caustic, others none
Effect of organic solvents — highly resistant
Water absorption — less than 1 per cent
Water permeability — very low
Burning rate — self extinguishing
Specific gravity — 1.70
Effect of age — none
Effect of sunlight — slight
Color possibilities — extensive

Specific:

Extrusion temperature — to 375° F.
Tensile strength — 25,000–45,000 psi
Elongation at yield point — 16–23 per cent
Resistance to heat (continuous) — Approx. 150° F.
Resistance to heat (intermittent) — 212° F.
Softening point — 240°–280° F.
Distortion point — 130°–150° F.
Clarity — translucent to opaque

Manufacturing Tufweb

The colored molded granules or powder received from the manufacturer are heated in an extrusion mold and forced through a suitable size die of slightly larger diameter than the finished filament. In order to strengthen its longitudinal properties it is necessary to orient the molecules along the major axis of the filament. This is accomplished by stretching and heating the filament after extrusion. When spooled the filament is ready for the weaving process.

The weaving is done on multiple, narrow fabric looms. Because of the narrowness of the webbing a short travel, gear driven shuttle is used. It is woven in a modified plain pattern as this gives the maximum strength and solidity of color. A wide variety of effects can be achieved by differences in the colors of the warp or filler filaments. These are 100 warp filaments and any combination of colors can be used. In addition the color of the filler filament can be the same or different from the warp. You will notice that the warp filaments are grouped into fours while the filler is single. This is done to create the maximum strength in the length of the fabric as the greatest strain when used for upholstering will be in that direction.

Adhesives

Joining or cementing Saran plastic is done with one of the ordinary organic solvents used in the plastics industry. It is not an ordinary glue or adhesive. Its action is to soften the plastic and make it possible for the two softened surfaces to meld in a slightly viscose state. Contact must be maintained but not excessive pressure. Pressure would lead to distortion of the shape of the two parts. However, these adhesives for plastics are not useful for joining the plastic to another material such as wood. An ordinary adhesive such as glue is best for this purpose. Pressure must be applied during the drying process but not enough to distort the shape.

AN EASY WAY TO REMOVE GLUE

R. L. GRANDLE
East High School
Wichita, Kans.

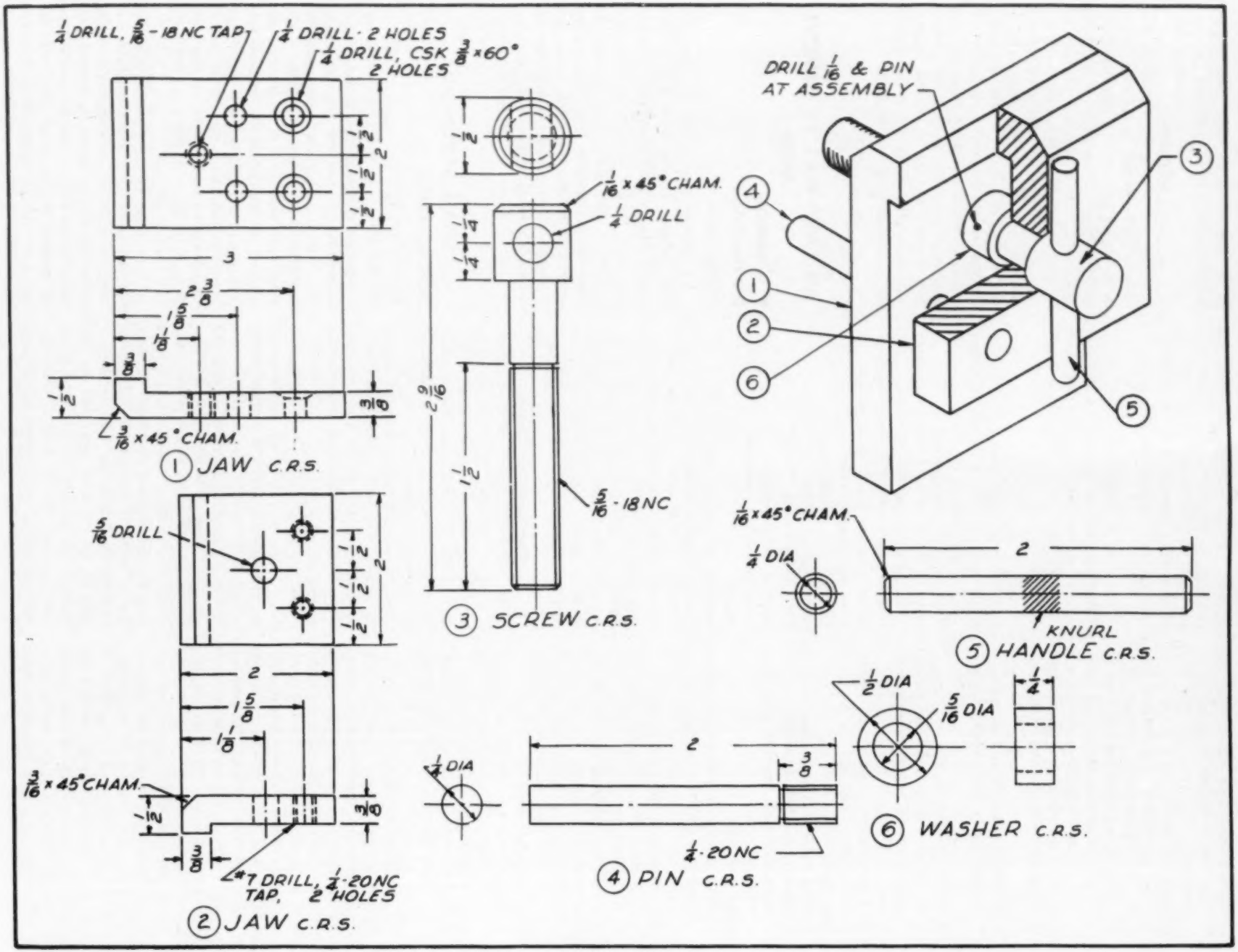
To remove glue which squeezes out from between boards when gluing them edge to edge or after assembling a project, pick up a handful of wood shavings and rub the surplus glue off. This must be done before the glue sets. This method is better than using hot water, as shavings are nearly always available and they do not weaken the joint by diluting the glue.

SMALL BENCH VISE

JOHN R. WALKER
Bel Air High School
Bel Air, Md.

A portion of the work done in our advanced machine shop is concerned with the construction of small gasoline and steam engines. We had difficulty in holding some of the smaller parts when working on them. After a little planning the small bench vise described herewith was designed. It is simple in construction with a minimum of parts and a "give" in the tolerances. It was made of cold-rolled steel using stock sizes (thickness and width) to save material and time.

To allow the student to plan his own work the work procedure is omitted here. However, there are some things we found to be helpful in the construction and fitting of the various parts. To be positive that the pins will line up properly with the holes in the solid jaw the screw was first made and the jaws were



Small bench vise

drilled and tapped. The jaws were then clamped together using the screw as the clamp, after which the holes were drilled and tapped for the pins. The handle may be held in place by center punching around the middle instead of knurling as shown in the plans.

AUTOMOBILES AND TELEPHONES

Census figures show that there are more autos than telephones on U. S. farms. Some 29 per cent of all motor trucks and 12 per cent of all passenger cars in this country are on farms. These represent a small percentage of the petroleum powered equipment farmers use to keep Americans supplied with food and other necessities. — *Petroleum Newsnotes.*

Project Design for Teachers

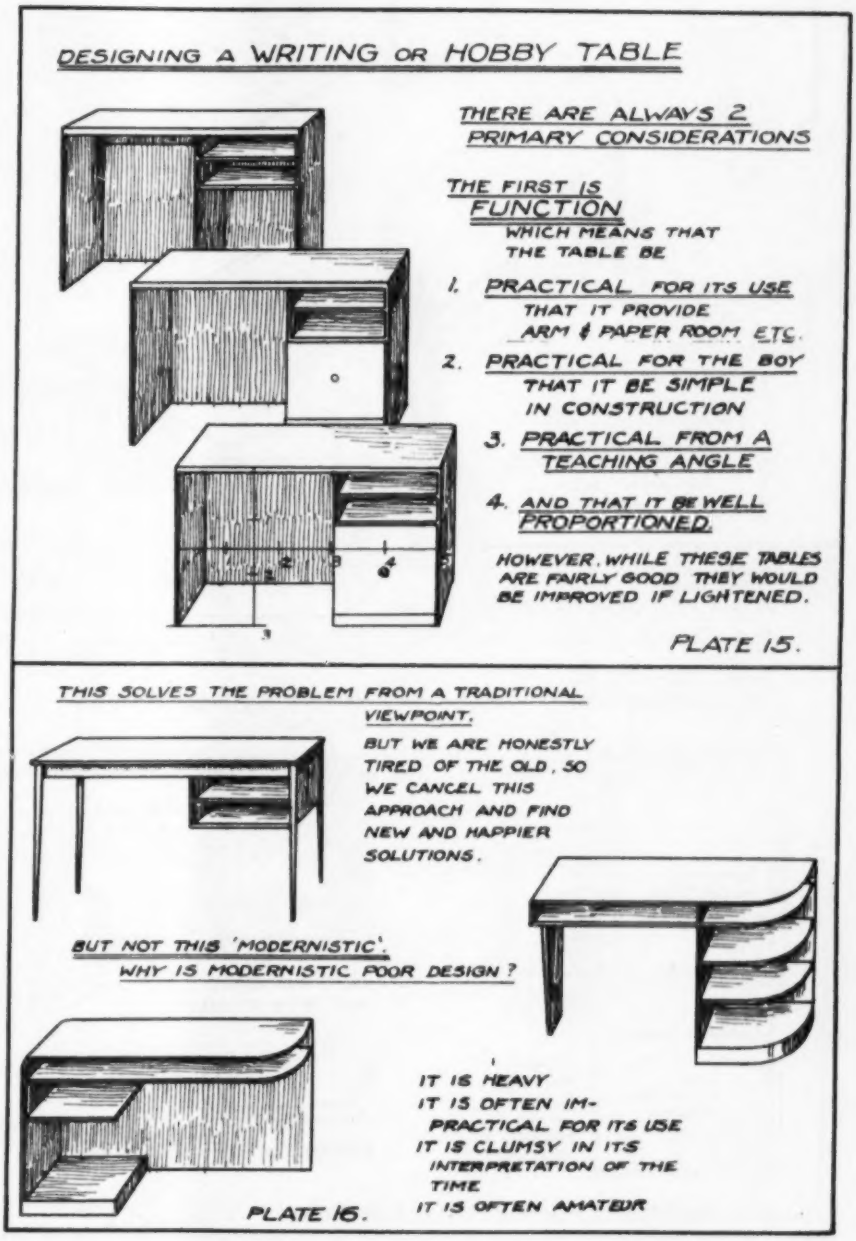
ALEXANDER F. BICK
Milwaukee, Wis.

(Continued from page 190 of the June, 1953, issue)

Industrial arts and vocational education should cease their sponsorship of old design forms for shop projects. This is the opinion of an ever increasing group of teachers. The new generation is no part of the past. Old styles do not represent our technological age. There never was a time when the past was so completely past. Therefore, valuable benefits must accrue to our departments, to children, and to the nation which we serve, were we unreservedly divorced from what lies behind, and were we fully decided, together, on creating new environments with new forms, new architecture, and new cities. This is an underlying purpose of our day.

The beautiful, well-proportioned period furniture built in some of our school shops is obsolete before it is built, and though warm and friendly, and popular in some localities, it copies and masquerades a period not ours. More seriously, it fails to create the spirit of this new phenomenon of ages.

Change from *periods* to *contemporary* is a natural process. Even in the day of periods, change was the order of procedure, no periods lasting over ten years, roughly: Chippendale period, 1760; Adam Brothers, 1770; Hepplewhite, 1780; Sheraton, 1790; and Hope, 1800 to 1810. What might the protagonist of a 1795 Sheraton say of our day that returns to Hepplewhite which he abandoned in 1790? The tendency of schools to dig in on the *old styles* line has blanked out horizons and allowed one of the most significant trends of present times to advance without benefit of schools. First, our most famous senior


DESIGNING A WRITING OR HOBBY TABLE
THERE ARE ALWAYS 2 PRIMARY CONSIDERATIONS
THE FIRST IS FUNCTION
WHICH MEANS THAT THE TABLE BE
1. PRACTICAL FOR ITS USE
THAT IT PROVIDE ARM & PAPER ROOM ETC.
2. PRACTICAL FOR THE BOY
THAT IT BE SIMPLE IN CONSTRUCTION
3. PRACTICAL FROM A TEACHING ANGLE
4. AND THAT IT BE WELL PROPORTIONED.
HOWEVER, WHILE THESE TABLES ARE FAIRLY GOOD THEY WOULD BE IMPROVED IF LIGHTENED.
PLATE 15.
THIS SOLVES THE PROBLEM FROM A TRADITIONAL VIEWPOINT.
BUT WE ARE HONESTLY TIRED OF THE OLD, SO WE CANCEL THIS APPROACH AND FIND NEW AND HAPPIER SOLUTIONS.
BUT NOT THIS 'MODERNISTIC'.
WHY IS MODERNISTIC POOR DESIGN?
IT IS HEAVY
IT IS OFTEN IMPRACTICAL FOR ITS USE
IT IS CLUMSY IN ITS INTERPRETATION OF THE TIME
IT IS OFTEN AMATEUR
PLATE 16.

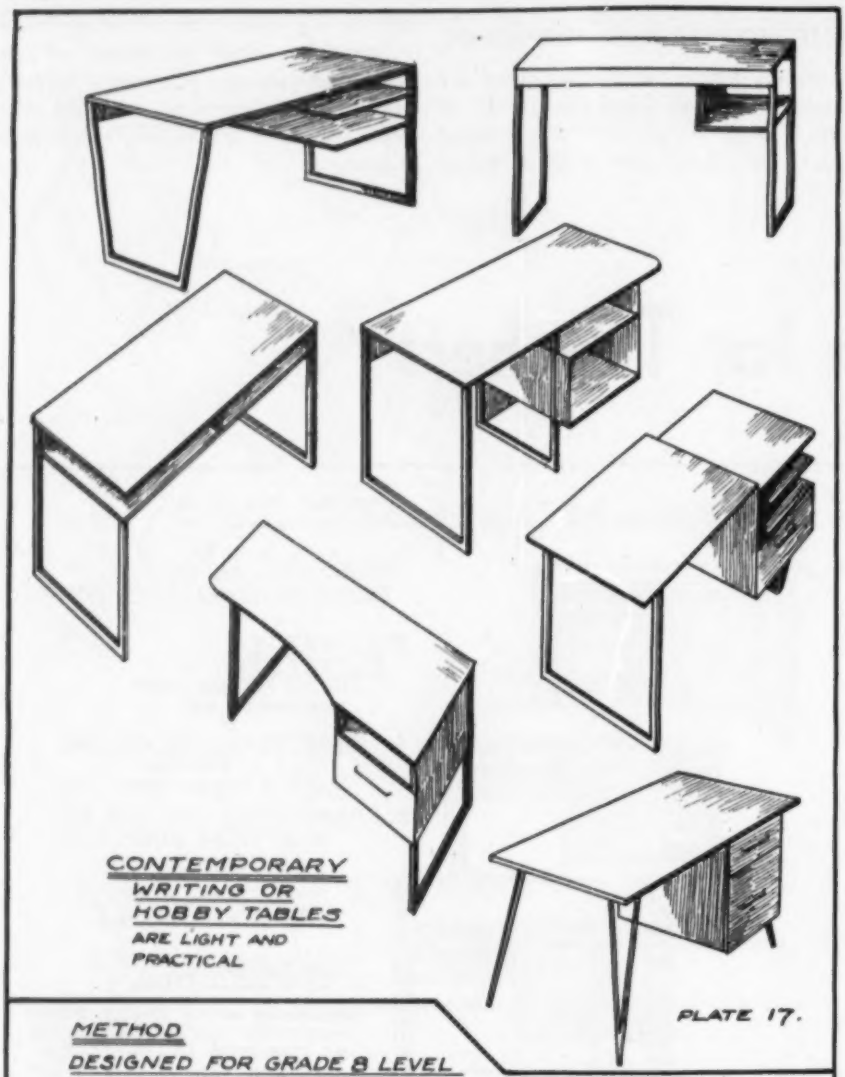


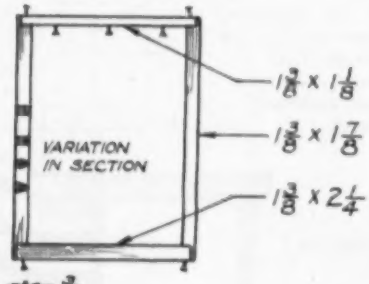
PLATE 17.

METHOD

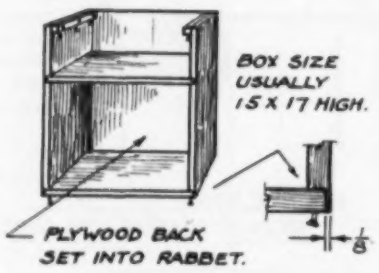
DESIGNED FOR GRADE 8 LEVEL

ALL JOINTS GLUED & SCREWED - TOP SIZE 19 X 38 TO 50 HEIGHT 28 O.A.

CONSTRUCTION OF LEFT END UPRIGHT



TYPICAL CABINET CONSTRUCTION



CABINET FOOT 10 IN. HIGH.

ALL PARTS MAY VARY IN SIZE & DETAIL.

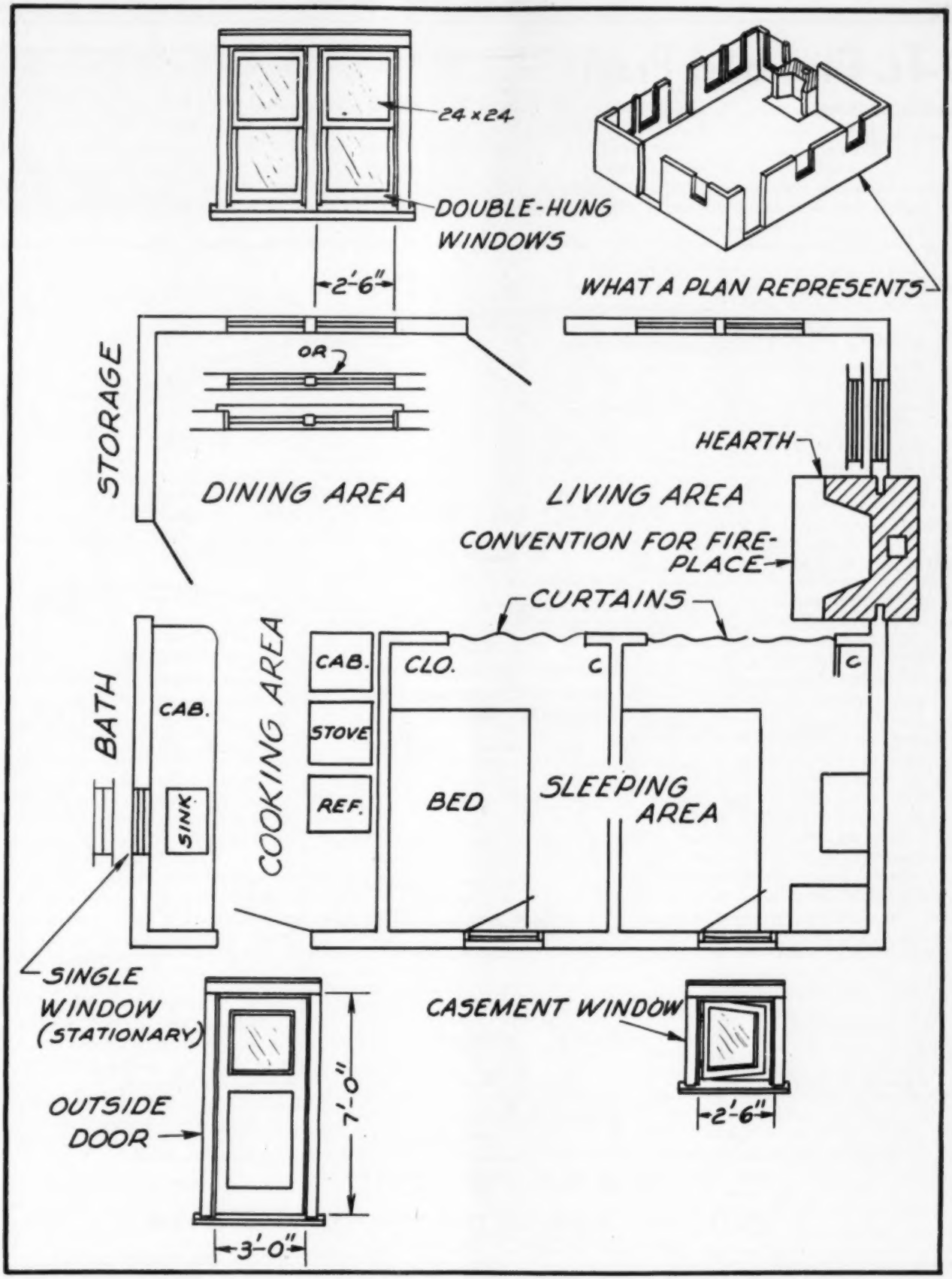
PLATE 18.

architect called us names and shook our bones, and other architects and industrial designers followed, hammering at our lethargy until many are moved. That all are not aroused as yet means nothing at the turn of eras. It is important, however, that teachers are aroused. A teacher, if not the director, should study the new if he is not really *the new*. He may do it as a duty, and yet, you all have friends who do it for the fun of it. The way is not a chore. If you wish to meet Mr. Jones, you arrange an introduction, a lunch, and a chat. You make no mistake about it, you meet the key man, hear what he has to say, and see what he has done. Just so, you introduce yourself to the key men and their philosophy while you sit in your easiest chair, allowing them to chat with you through the report of critics (who themselves are no mean authorities) and through their work, all laid before you in the professional magazine in your hand. Critics comb the field and serve you the best examples of the times. This is the sure way.

Buy or borrow current issues of the *Interiors* magazine, a journal for interior decorators and designers. Listed at the end of this article are this and other recommended design sources. Be satisfied with no other. In the quest for dependable knowledge one may so easily acquire the spirit of the trend by mere month by month association and *soaking up*, turning pages and examining pictures. This, a teacher owes to his profession.

Take your time before applying the new principles in your classroom. This is not high-pressure advice, but ease into the change as you gain confidence. Thereafter, the process of creating a new design follows the order given below. (Part of the process was given in the preceding article. This one takes for granted a well-established background of essential contemporary form built up from contacts made as prescribed.)

Start the design of your project by following the method described in Plate 18. Since art necessarily modifies the functional shape to fit the spirit of the times, it also must be carefully considered. The designs shown in Plate 17 are devised to be functional representations of the light, mobile, and off-the-ground quality that marks our present air age. You might expect such designs to be airy, straightforward, and new in concept. These terms are descriptive of contemporary design.



Instruction sheet—how to interpret and draw a cottage plan. By Geo. A. Willoughby, Michigan State Normal College, Ypsilanti, Mich.

9-Ft. Plywood Pram

CLAUDE W. HORST

Seattle, Wash.

This 9-ft. plywood pram is very sturdy, easy to build, light in weight, and will carry three adults with ease. The writer has used this type of project and found it most satisfactory. It makes an excellent project for junior or senior high school students. The whole project is also designed to conserve shop space since the structure may at any time during the construction period be moved about or set on end against the wall where it will be out of the way. The project has many desirable characteristics, the most important being that most boys would like to own it and therefore are willing to try to meet the necessary requirements. The project offers excellent learning situations, some of which are listed as follows:

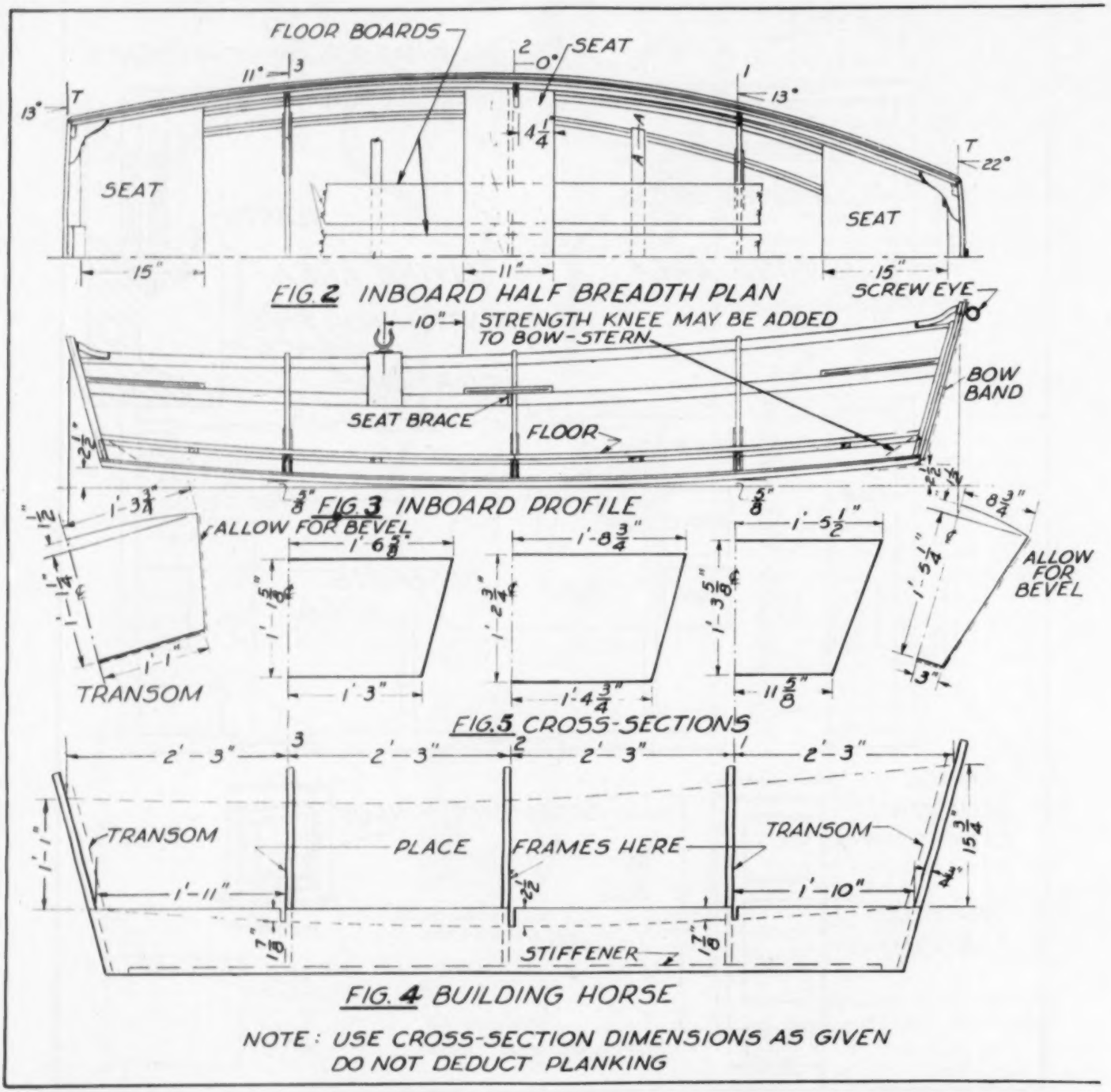


Fig. 2. Inboard half breadth Fig. 3. Inboard profile Fig. 4. Building horse Fig. 5. Cross sections

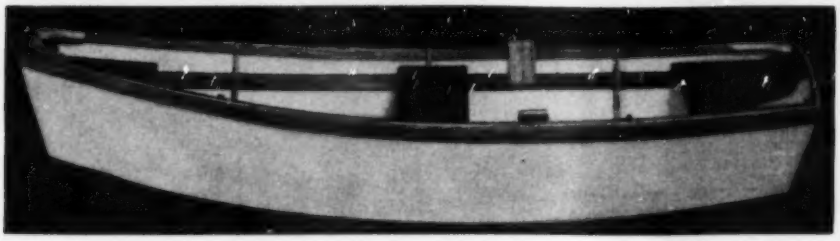


Fig. 1. 9-ft. Plywood pram

1. It requires learning how to read the drawings in order to construct the various parts according to the dimensions given.

2. It is necessary to learn how to make a complete bill of material, figure the board feet of lumber needed, the number and kind of fastenings required, and to make an estimate of the cost of the boat before being allowed to start.

3. A certain construction sequence must be followed which requires considerable planning.

4. It requires a goodly number of hand tools which the student must learn to use with skill.

5. It may be built by one boy or it may be a group project.

6. It is a safe and useful project and yet is not too expensive.

7. It is a project that would be well received by most parents.

8. The nature of the project is such that any part of the construction which is not up to standard may easily be replaced with better workmanship.

9. The student learns something about boat construction during the building process, and something about boat handling and seamanship through his experiences with it in actual use in the water. It may be rowed, sailed, or an outboard motor may be used.

The sequence outlined below need not be followed too closely in making various parts, but the sequence given in assembling the various parts on the building horse should be rather closely followed.

Bill of Materials

All materials should be of the best quality boat material, free of knots, pitch seams, or any other defects. All long pieces must have straight, fine, even grain. Material for the frames should be vertical grain stock. Material for the battens should be quarter-sawed, air-dried stock.

Material for the Horse

The material need not be good but it should be S4S and straight.

2	1" x 8" x 9'-0" longitudinal sides
1	1" x 8" x 8'-0" stiffener
1	1" x 8" x 12'-0" uprights

Material for the Pram

Item	*Quantity*	*Size*
Transom cheeks	1	1" x 12" x 24"
Top side frames	1	1" x 12" x 36"
Bottom pieces	1	1" x 3" x 12'
Sheer battens	2	½" x 1½" x 10'
Chine battens	2	½" x 1½" x 10'
Seat riser	2	½" x 1½" x 10'
Transom knees	1	¾" x 5" x 24" W.O.
Keel	1	⅝" x 2" x 10' W.O.
Rub rail	2	⅝" x 1½" x 10' W.O.
Oarlock blocks	2	1" x 4" x 7" W.O.
Floor boards	3	½" x 5" x 8'
Floor supports	1	¼" x 2" x 9'-0"
Seat brace	1	¾" x 2" x 3½'

W. P. Plywood

1	¼" x 24" x 48"	Framing panel
1	½" x 18" x 60"	Transoms
1	½" x 11" x 42"	Center seat
1	¼" x 36" x 10'	Two sides
1	¼" x 42" x 9'	Bottom

Fastenings

Gal. Screws

1 gr.	1¼"	No. 8 F.H.S.
60 only	2"	No. 10 F.H.S.
60 only	1⅜"	No. 8 F.H.S.
2½ gr.	⅝"	No. 7 F.H.S.
1 gr.	1¼"	No. 7 F.H.S.
2 gr.	⅞"	No. 7 F.H.S.

Nails

½ lb. 6*d*. finish (galvanized) where needed on pram
½ lb. 6*d*. box
½ lb. 8*d*. box
½ lb. 10*d*. box
1 box No. 16 by ¾ in. brads (gal.)

Equipment Required

1 Pair of 7-ft. oars
1 Pair of oarlocks
1 Pair of oarlock sockets
1 Bow line (painter) 15 ft. of ½-in. rope

Metal

1 Bow band ⅛ by ½ by 24 in. gal.
1 ⅜16 by 1½-in. screw eye for painter.

1. *The Building Horse:* Lay out accurately the two longitudinal pieces according to the drawing in Figure 4 and cut out. Cut out transom and frame upright supports and assemble the structure. Use 10*d*. box nails. Be sure the stiffener piece is straight. Mark the center line on the uprights and the horse is ready for use.

2. *Transoms:* Lay out the transom pieces according to the dimensions given in the cross sections (Fig. 5). Cut them oversize to allow for a 22° side bevel on the bow piece and a 13° side bevel on the stern piece. See Figure 2. Bevel and notch the transom cheek pieces A and B as shown in Figure 6. Attach them to the transom pieces with W.P. glue and No. 10 by 1¼-in. F.W.S. gal. A reinforcing piece, ¾ by 6-in. length to suit, may be added to the stern transom if a motor is to be used. See Figure 6. Transoms are attached to the horse with two No. 10 by 1¼-in. F.H.S., or clamps may be used.

3. *The Frames:* The frames are made of ⅝ by 2-in. stock. All frames except No. 3 are beveled as shown in Figures 2 and 3. Considerable stock may be saved by cutting the top side frames properly beveled from a piece of ¾ by 11½-in. by 3-ft. stock.

The frame bottom cross members may be cut from a piece of ¾ by 3-in. by 12-ft. These pieces need not be beveled until the frames are completely assembled since the angles are all small.

A piece of ¼-in. plywood 24 in. wide and about 4 ft. 4 in. long makes an excellent framing panel (Fig. 7). It will be less confusing to use both sides of the panel for laying out the frames. Two frames may be laid out on one side and the other out on the opposite side. The frames should be laid out according to the dimensions given in the cross section drawing (Fig. 5). Cut the proper angles to the various frame pieces and carefully cut the batten notches as shown in Figure 8. Then arrange them on the panel as shown in Figure 7. Tack them temporarily in place on the panel. Cut the gussets of ¼-in. plywood as shown in Figure 8A and attach them to the frames with Weldwood glue, or equivalent, and ¾-in. F.H.S. Gussets are made of surplus stock left when cutting the side pieces. Hold the gussets in place with ¾-in. No. 18 galvanized brads. Attach a temporary brace across the top of the assembled frame with 6*d*. nails. The brace on frames 1 and 2 should be on the forward side. On frame 3 the brace should be on the aft side. Do not disturb for 24 hours, then put the gussets on the other side. Next check the bevels for the top-side frames, bevel the bottom, and cut the limbers (Fig. 8). Repeat the above procedure for the other frames. Locate the center line on each top brace and the bottom frame member (Fig. 7). The frames are now ready to be placed at their proper position on the horse (Fig. 9). Be sure to put them on the proper side of the horse frame supports (Fig. 4), line the center line of the frame with the center line of the supports and fasten them in place with 8*d*. nails. Do not drive the nails all the way in so that they may be pulled out later. A small spacer block should be placed between the frame brace and the horse frame supports.

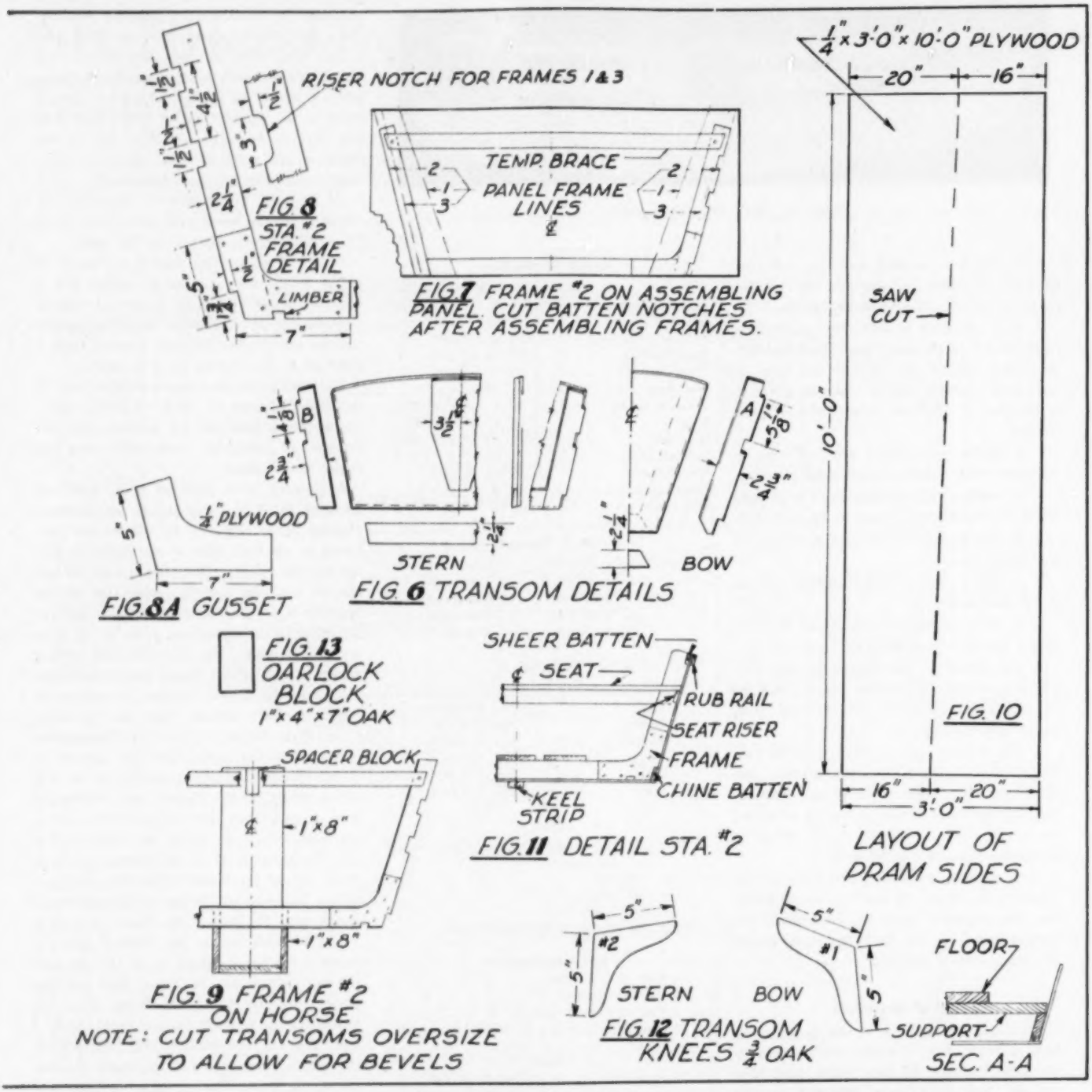


Fig. 6. Transom details, Fig. 7. Framing panel, Fig. 8. Frame detail, Gusset 8A, Fig. 9. Frame No. 2 on building horse, Fig. 10. Layout of pram sides, Fig. 11. Detail of pram at Sta. No. 2, Fig. 12. Bow and stern knees, Fig. 13. Oarlock blocks

This will permit the frame to stand perpendicular on the horse.

4. *Sheer Battens:* The sheer battens are made of ½ by 1½-in. by 10-ft. pine stock. Cut the front end to fit the angle of the bow transom. Drill and countersink the front ends for a No. 8 by 1¼-in. No. 8 F.H.S., screw the front end to the bow transom and clamp them in place one at a time, putting clamps at each frame but none at the stern transom. As soon as both battens are clamped in place, loosen the clamps a bit to relieve the strain in case the bending of the first batten might have distorted the structure of a bit. Check the structure for accuracy, shift where necessary, and again tighten all clamps and attach the battens to the frames with No. 8 by 1¼-in. F.H.S. Hold the aft ends of the battens even with the top of the stern transom and then mark them for the batten notch. This cut is tricky so cut it a bit oversize the first time for a check and then make the final cut. Drill the anchor holes for a 1¼-in. No. 8 F.H.S. through the battens and

into the frames. Then drill and countersink the batten pilot holes for No. 8 F.H.S. and attach.

5. *Chine and Riser Battens:* Bevel the bottom of the chine battens and the top edge of the risers. Then repeat the procedure just discussed for attaching the sheer battens.

6. *Siding:* Lay out the two side pieces on ¼-in. exterior plywood (Fig. 10). Cut out oversize and clamp one side piece in position on the framed structure. Mark where the sheer and chine battens contact the side piece, trim the piece carefully leaving it about ¼ in. oversize all around. Cut the second piece exactly like the first, using it for a pattern. Apply glue to all contact surfaces and attach the side pieces in position with C clamps or hand screws. Loosen the clamps, if necessary, to shift either of the side pieces. Retighten the clamps and drive the ¾-in. No. 8 F.H.S. 3 in. center to center. The clamps may be removed as the screws are driven.

7. *Remove the Structure From the Horse:* Remove all fastenings which hold the structure to the horse and lift it from the horse. Place it upside down on some sawhorses or boxes. Saw off the surplus stock at the ends and edges of the siding so the sides will be even with the chine battens, bottom frames, and transoms. Check the bottom of the whole structure, including the bottom of the transoms, and see that it is even all around for the bottom.

8. *The Bottom:* Place the bottom material on the structure and mark all around. Cut about ⅛ in. oversize all around. On the bottom piece lay out the surface which will contact the structure, including the transoms, bottom frames, siding, and chine battens. Smear glue on all contact surfaces and place the bottom in position on the structure and hold in place with No. 6 by ¾-in. brads. Then drive No. 7 F.H.S. 3 in. center to center. Trim off the bottom piece all around and mark for the keel strip.

9. *The Keel:* The keel is an oak strip ⅝ by 2 in. by 10 ft. attached with No. 8 by 1¼-in. F.H.S., two at each frame, and transom. (See Figs. 3 and 11.)

10. *Bow and Stern Knees:* Turn the boat right side up. Shape the bow and stern knees of ¾-in. oak stock and fit them carefully (Figs. 2 and 12). Attach each with 4 only No. 10 by 1½-in. F.H.S. Countersink the heads flush with the siding.

11. *Seats:* The seats are made of ½-in. plywood stock. Cardboard patterns carefully fitted may be used to mark the seats accurately. Allow for bevel and cut out. Attach the bow and stern seats first. Finish the edges carefully and paint or varnish the underside and edges with several coats before permanently attaching them to the seat risers with No. 7 by 1¼-in. F.H.S. If the temporary cross brace interferes with the center seat installation, it may be removed.

12. *Trimming the Sheer:* Cut off all frame tops and trim off the plywood siding even with the sheer batten (Fig. 11).

13. *Strength Knees:* Strength knees (Fig. 3) may be added if the boat is to be motor driven. Make them of 1-in. oak. Cut out and fit carefully. Attach them with 2 only ¼-in. carriage bolts, length to suit.

14. *The Rub Rail:* The rub rails should be made of hardwood ⅝ by 1½-in. stock. White oak is good as it is hard and flexible. Round the outside edges (Fig. 11) and attach them to the boat with No. 8 by 1¼-in. F.H.S., 6 in. center to center, alternately placed near the top and bottom edge. Cut off the ends even with the transoms and round the ends as shown in Figure 2.

15. *The Oarlock Block:* The oarlock blocks should be made of hardwood such as white oak. Shape as shown in Figures 3 and 13. Bore a through hole for the oarlock socket and attach each block to the boat with 2 only ¼ by 5-in. carriage bolts.

16. *Seat Braces:* Attach a small brace under the center seat to prevent excessive flexing as shown in Figures 2 and 11.

17. *Floor Boards:* The floor should be made in two removable sections which meet on frame 2 under the center seat. Slats 1 by 5 in. with the length cut to suit are spaced as desired and fastened to two cross members to each section with No. 7 by 1-in. F.H.S. This completes the floor, as shown in Figures 2, 11, and in Section A-A, Figure 12.

18. *Bow Band:* The bow band may be a piece of brass or galvanized iron, ⅛ by ½ by 24 in. Drill and countersink holes for 6 only No. 7 by ¾-in. F.H.S. Attach it to the bow transom after all finishing coats have been put on. Put a screw eye near the top of the bow transom for the painter, Figure 3.

19. *Finish:* Check the hull carefully for any unfinished work. All edges should be well sanded to make a smooth, even surface. The boat may be finished natural or be given some desired color. In either case put on a seal coat. Then apply coats of marine finish. Attach the stem band and the boat is ready for use.

A CLEANUP TECHNIQUE FOR THE JUNIOR HIGH SCHOOL SHOP

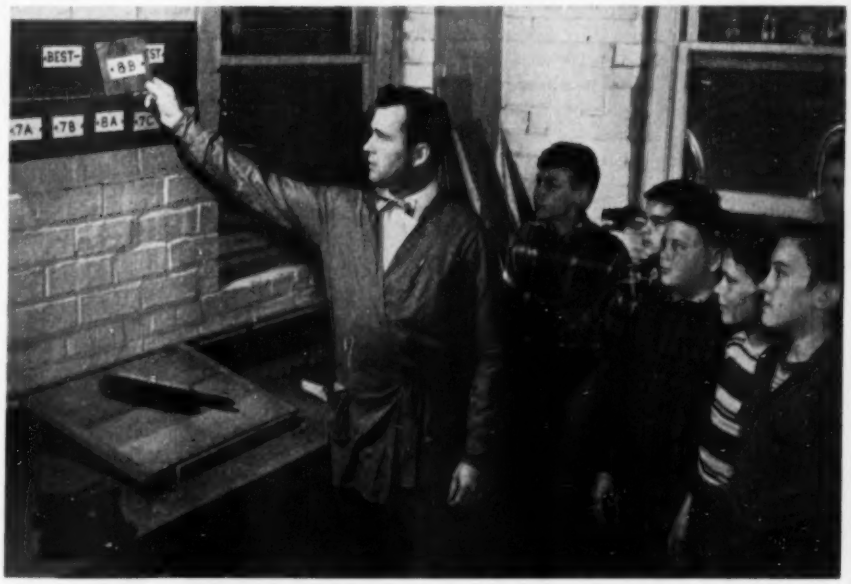
BILLIE WESLEY BROWN
Industrial-Arts Instructor
Logan Junior High School
Murphysboro, Ill.

Cleanup in the Logan Junior High School general shop, Murphysboro, Ill., is no longer a casual, hurried afterthought to the students' daily program. Cleaning up is a vital part of the students' work in the shop — by their own choice.

Motivation

At the junior high level, children are highly group conscious. They like to be associated with a doing or action group. They like to see their name or the name of their group on something they have done or made.

In order to motivate the students toward a better attitude and understanding of a clean, well-kept work area, a wall plaque has been placed in the shop with individual plac-



The cleanup technique in action

ards for all six grade sections. Five of the sections are arranged on the same horizontal plane with the remaining section placed above the others. On either side of this top section, the word "BEST" is easily noticed. At the end of the day or week, the section that has cleaned the shop the best is moved up to the position of honor.

Personnel Plan

This wall plaque motivation can be used in conjunction with the rotating disk personnel assignment chart. By using a personnel plan, no one individual will have the same cleanup job two days in a row. It is also possible to pinpoint the individual who is failing to meet the standards that the students themselves have set up. If one or two boys tend to forget their class spirit for a moment, however, the other boys are sure to remind them to get busy — usually with the admonition: "Do you want 8-B to beat us again?"

Results Attained

The classes entering the shop seldom fail to notice the appearance of the work areas, floor, tool panels — and the wall plaque.

Exemplary work habits and critical evaluation of their own and others' workmanship are being developed with the aid of this technique. These same habits and evaluations tend to prevent the idea from functioning on a competition-reward basis.

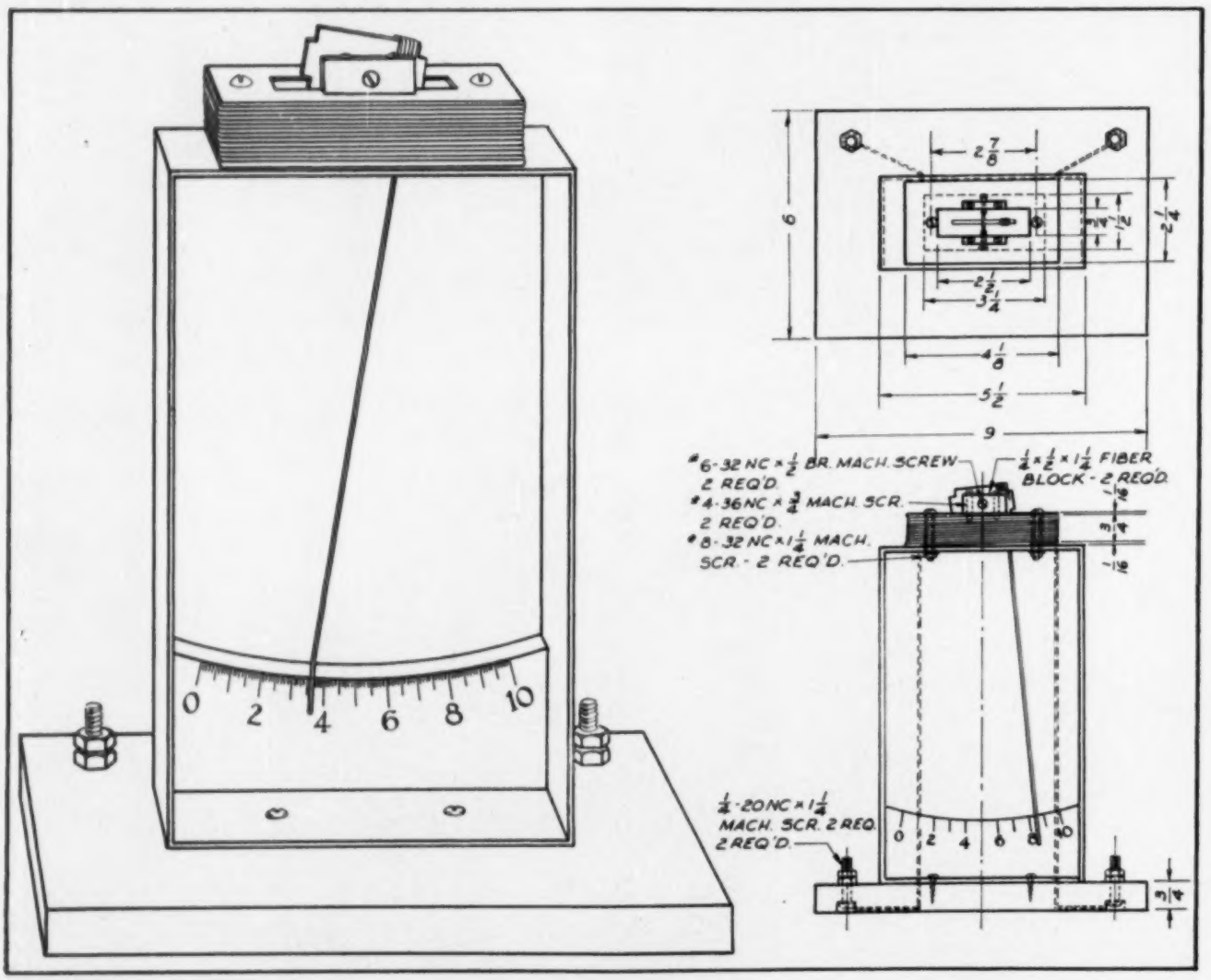
A CIGAR-BOX AMMETER

VICTOR J. GUENTHER
Buffalo, N. Y.

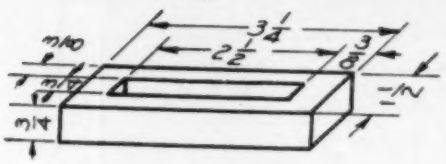
The principle of this ammeter is the same as of a commercial ammeter. The stationary coil sets up a magnetic field, and the magnet to which the pointer is attached, moves to point in the direction of the lines of force.

BILL OF MATERIALS

No. of pcs.	*Material*	*Size*
1	Cigar box	
12 or 15	Old razor blades	
1	Phonograph or other needle	
	¾-in. thick wood	
	No. 18 annunciator wire or 16, 18, or 2d magnet wire	
2	R.h. brass machine screws	5/32 x 1¼ in.
2	R.h. brass machine screws	9/32 x ½ in.
2	R.h. brass machine screws	4/30 x ¾ in.
2	R.h. brass (or iron) machine screws	¼ x 1¼ in.
1 ft.	No. 18 aluminum wire, or No. 20 copper wire	
	Nuts, wood screws, cork, Duco cement	


0 2 4 6 8 10
2 7/8
6
2 1/4
2 1/2
3 1/4
4 1/8
5 1/2
9
#6-32 NC x 1/2 BR. MACH. SCREW 2 REQ'D.
#4-36 NC x 3/4 MACH. SCR. 2 REQ'D.
#8-32 NC x 1 1/4 MACH. SCR. - 2 REQ'D.
1/2 x 1/2 x 1 1/4 FIBER BLOCK - 2 REQ'D.
1/4-20 NC x 1 1/4 MACH. SCR. 2 REQ. 2 REQ'D.
3/4

A cigar-box ammeter



Directions for Making

1. Make the solenoid. Cut out a piece of ¾-in. wood as per dimension shown. Then cut out the two pieces of 1/16-in. fiber and fasten to wood block with 1¼-in. machine screws, and a little glue or cement.

2. Wind the spool with No. 18 annunciator wire or magnet wire. The size wire determines the capacity of the ammeter. If you want to make a voltmeter use No. 36 wire.

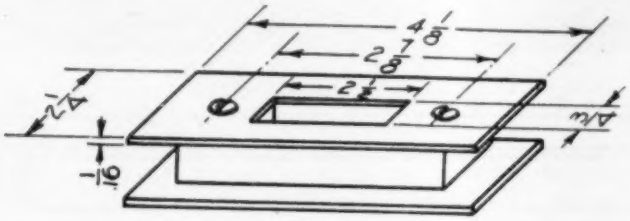
3. Assemble the base, cigar box, and solenoid putting in binding posts and connections as shown.

4. Make the moving part. Take 12 or 15 razor blades and stick them together with glue or cement. Fill the hole in the center with cork, glued in place, and put a needle through, which has been sharpened at both ends.

5. Attach the pointer wire by winding it several times around the razor blades as far from the center as possible. No. 18 aluminum wire is best but No. 20 copper wire may also be used.

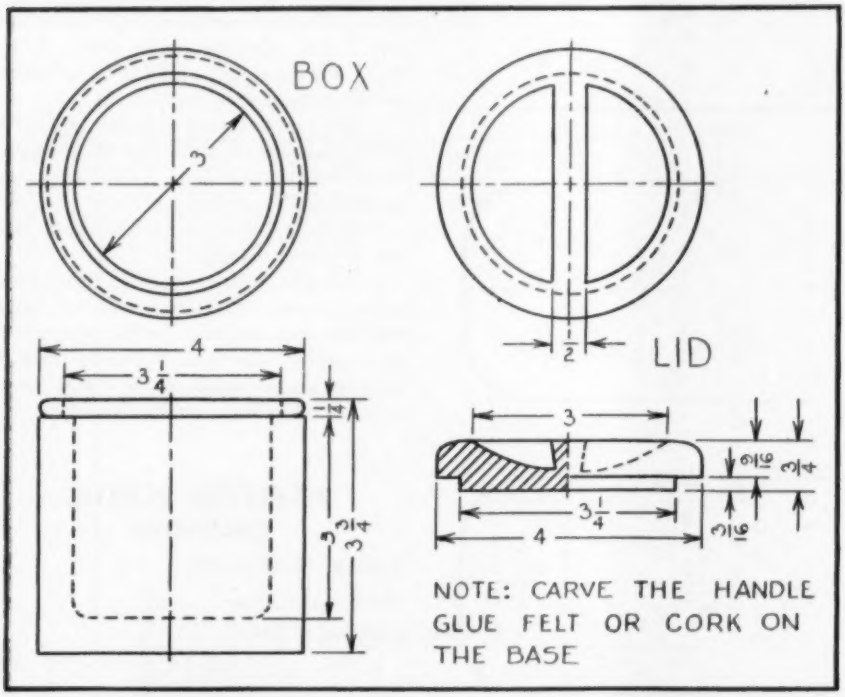
6. Magnetize the razor blades by holding against an electromagnet or Alnico magnet.

7. Cut the ¼ by ½-in. fiber blocks and tap for 6–32 machine screws. The screws should be indented at the ends to hold the points of the needle.



8. Cut the block of wood for ammeter calibrations and glue a piece of white cardboard to it.

9. Completely assemble and calibrate the scale by means of a standard ammeter in series. If the instrument is too sensitive, take off turns, or add weight to the moving part below the pivot. If not sensitive enough, add weight above the pivot.



Turned box by James E. Seitz, industrial-arts instructor, East Juniata Junior-Senior High School, Huntingdon, Pa.

JIG FOR MAKING BRACELETS

DAVID E. COHEN
Industrial Arts Department
Cooper Junior High School
New York, N. Y.

The jig described herein is one that will last, save much time, and will serve to make hundreds of bracelets of various designs. The student may use a template, or punch out his own design. Bracelets may be made of copper, aluminum, nickel silver, or any suitable material.

MATERIALS REQUIRED

No. of pcs.	*Material*	*Size*
1	C.R.S. (upper punch guide plate)	1/8 x 2 x 6½
1	C.R.S. (lower die plate) spot only	¼ x 2 x 6½
2	Machine screws	¼ x ⅜ r.h.

Top Guide Plate

1. Smooth up edges with a file. Then polish with emery cloth, and copper sulphate.

2. Lay out center lines. Do this carefully.

3. Set dividers to 3/16 in., and space off three spaces on each side on the vertical center line.

4. Set dividers to 5/16 in., and space off eight spaces, each side on horizontal center line.

5. Set combination square protractor to connect top mark on the vertical center line, to the third space mark toward the right on the horizontal center line. This will give the angle for scribing all lines from left and right of center line.

6. Lightly center punch all the intersecting points. There will be a total of 215 center punch marks.

7. With a No. 36 drill make all of the holes through the top plate, being careful to file off all burrs, and keep drill press table clear of chips.

8. Lay out and drill two ¼-in. holes at the end of the upper plate.

Lower Die Plate to Be Spotted Only

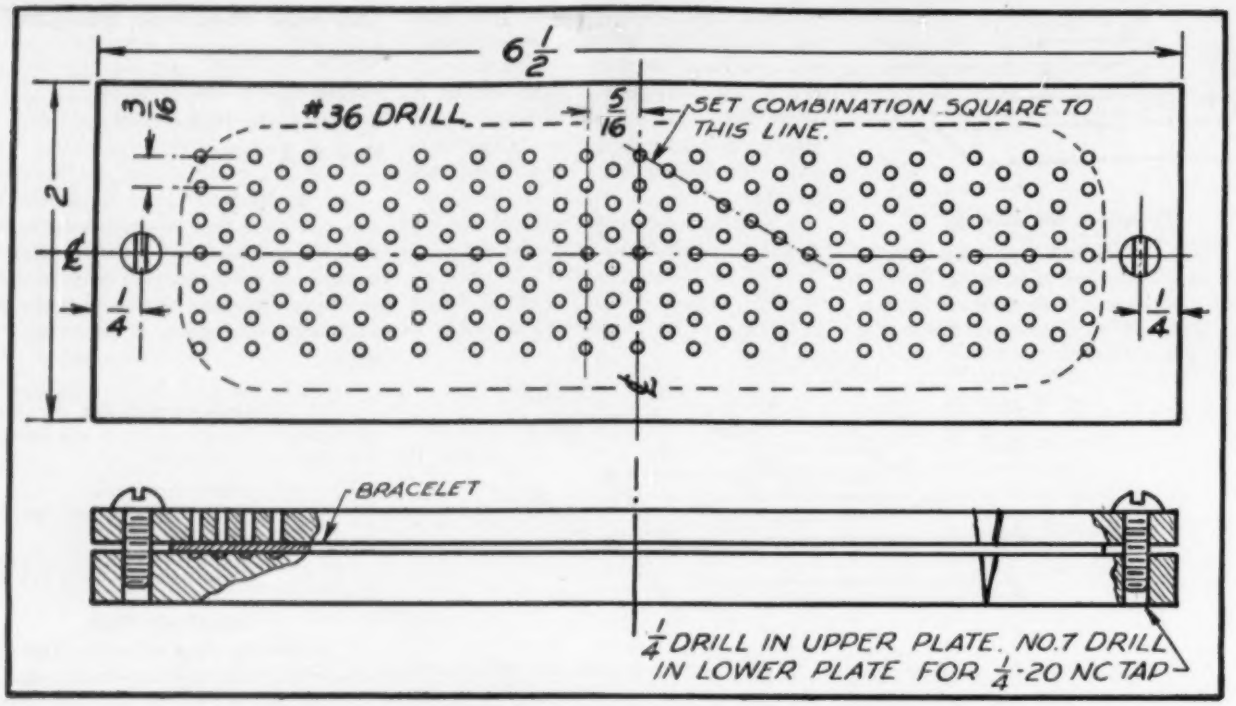
1. Lay out and drill a No. 7 hole for a ¼-20 n.c. tap.

2. Countersink with 60-deg. countersink, then tap with ¼-20 n.c. tap.

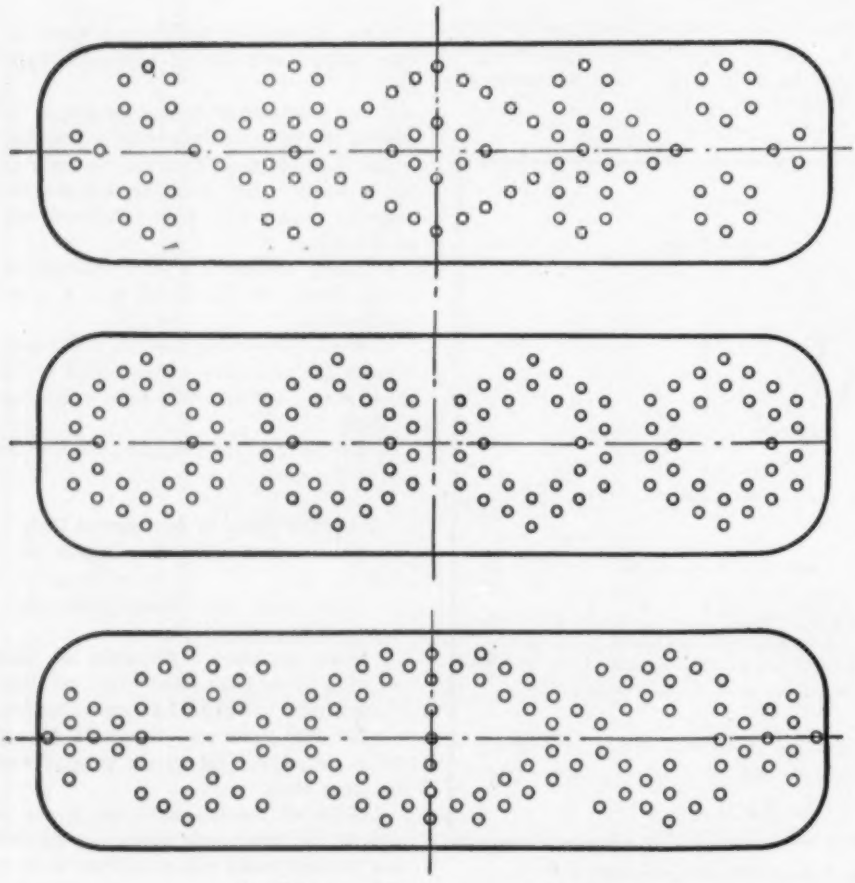
3. Screw top plate to the lower die plate and file a *V* mark, as shown. This will assist in aligning the two plates for future assembly.

4. Set drill press stop, to spot a No. 36 drill a full point. Spot all the holes through the upper plate.

5. Take off the top plate and respot all holes in the lower plate with a No. 31 drill that has been honed with an oilstone to round off the point.



A jig for making bracelets



Bracelets made by means of the jig

6. Make some punches out of No. 36 drill rod, about 2½ in. long. Half round the ends.

7. Place the bracelet blank, polished side down (for this will be the designed side) on the lower die, exactly in the center. Now place upper guide plate upon blank and holding this down firmly, place the screws in the jig by hand; then use a small screw driver to tighten the two plates securely together.

8. Now punch through the upper plate with the punch described in step 6 in the directions for making the upper plate. In this way many symmetrical designs may be made. It is best to start in the center and work toward each side of the center line.

9. To make initials or letters, draw them first on paper; hold this against a window pane and trace the letter on the reverse side of the paper. Follow this side of the paper in stamping in the initials, as the design comes out on the bottom of the bracelet blank.

PERPETUAL PLASTIC CALENDAR

DON R. PANGBORN
North High School
Sheboygan, Wis.

In choosing projects for general shops it is sometimes difficult to obtain one that will cover several areas and still provide the necessary student interest and incentive.

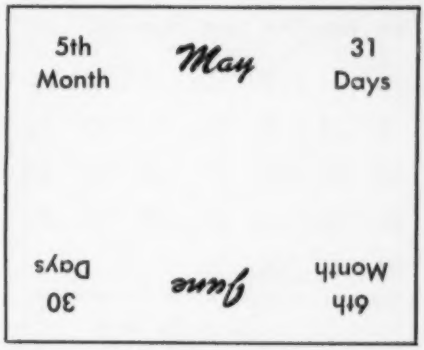
Perpetual plastic calendar

Pictured is a project that seems to fill the bill, a perpetual plastic calendar. Of course if plastics is not one of your areas, a wooden base is easily substituted. The size of the base and its composition can be varied to suit your various needs and to incorporate other operations.

The calendar insert consists of seven cards. Three of the cards have the months printed on the top, bottom, and reverse side as shown in Figure 1.

The other four cards have the days of the month printed on both their front and reverse sides. The first day of the month is started on Sunday on the first card, and on the succeeding cards the first of the month appears on each day of the week.

Each of the cards shown in Figure 2 has 31 days. This is taken care of for those months not having 31 days with the monthly separators, as they indicate the prescribed number of days.



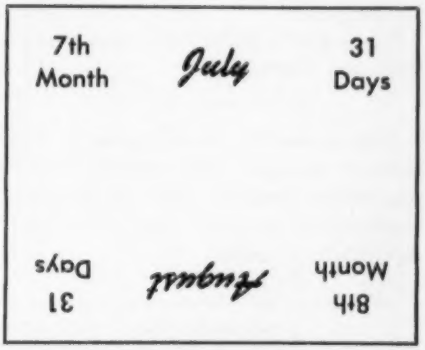
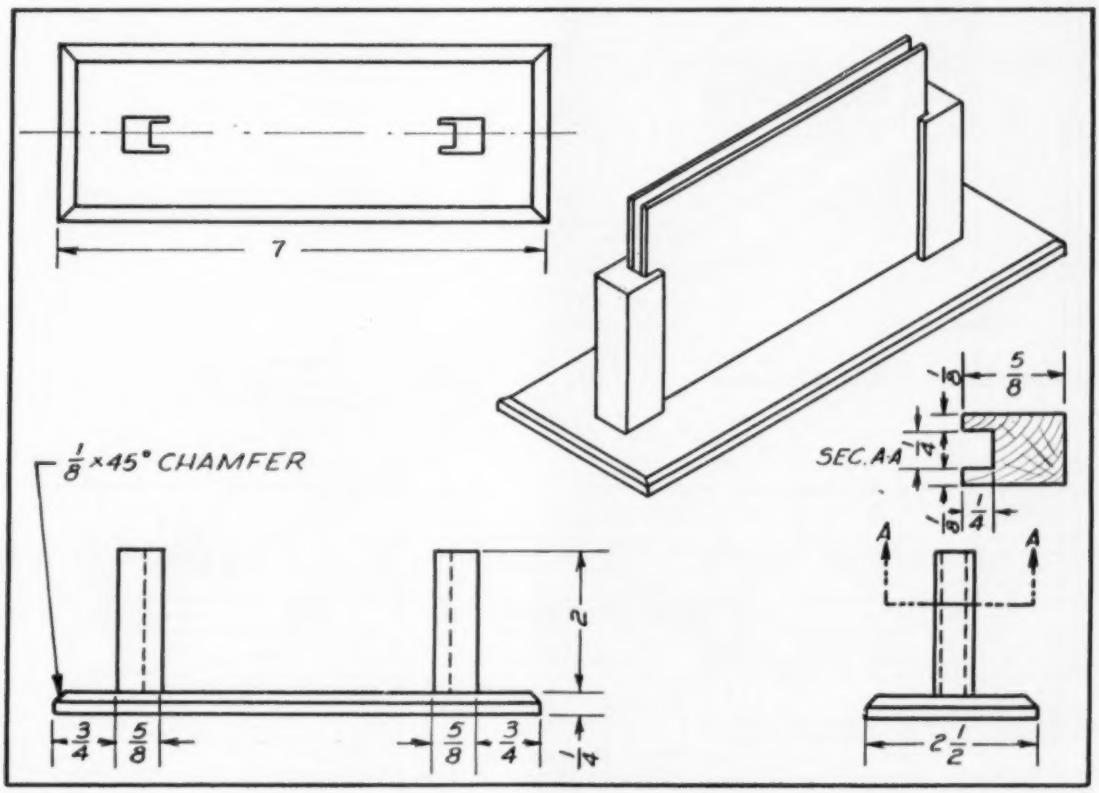


Fig. 1. Front and reverse sides of the month cards



Details of perpetual calendar

SUN	MON	TUE	WED	THURS	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Fig. 2. Calendar cards

After its construction, with careful use, it can easily live up to its name of Perpetual Calendar.

Photograph by North High School Camera Club, Carl Enger, sponsor.

Falls account for more injuries to farm residents than any other type of accident. Machinery, livestock, and motor-vehicle accidents follow in that order. — *The National Safety Council.*

PADDING MACHINE

H. W. BOETTCHER
Head, Shop Department
Senior High School
San Bernardino, Calif.

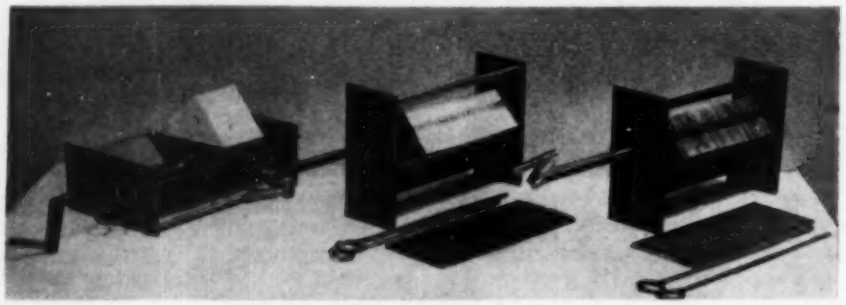
Many schools will welcome this piece of equipment which has been used with good success in our print shop. The gluing up of pieces of papers into pads has been a problem for years.

Advantages of padding by this method are as follows: (1) it makes neater work possible; (2) the work can be done faster; (3) the device can be stored under the table while the pads are drying; (4) no definite shop space is required for padding the paper.

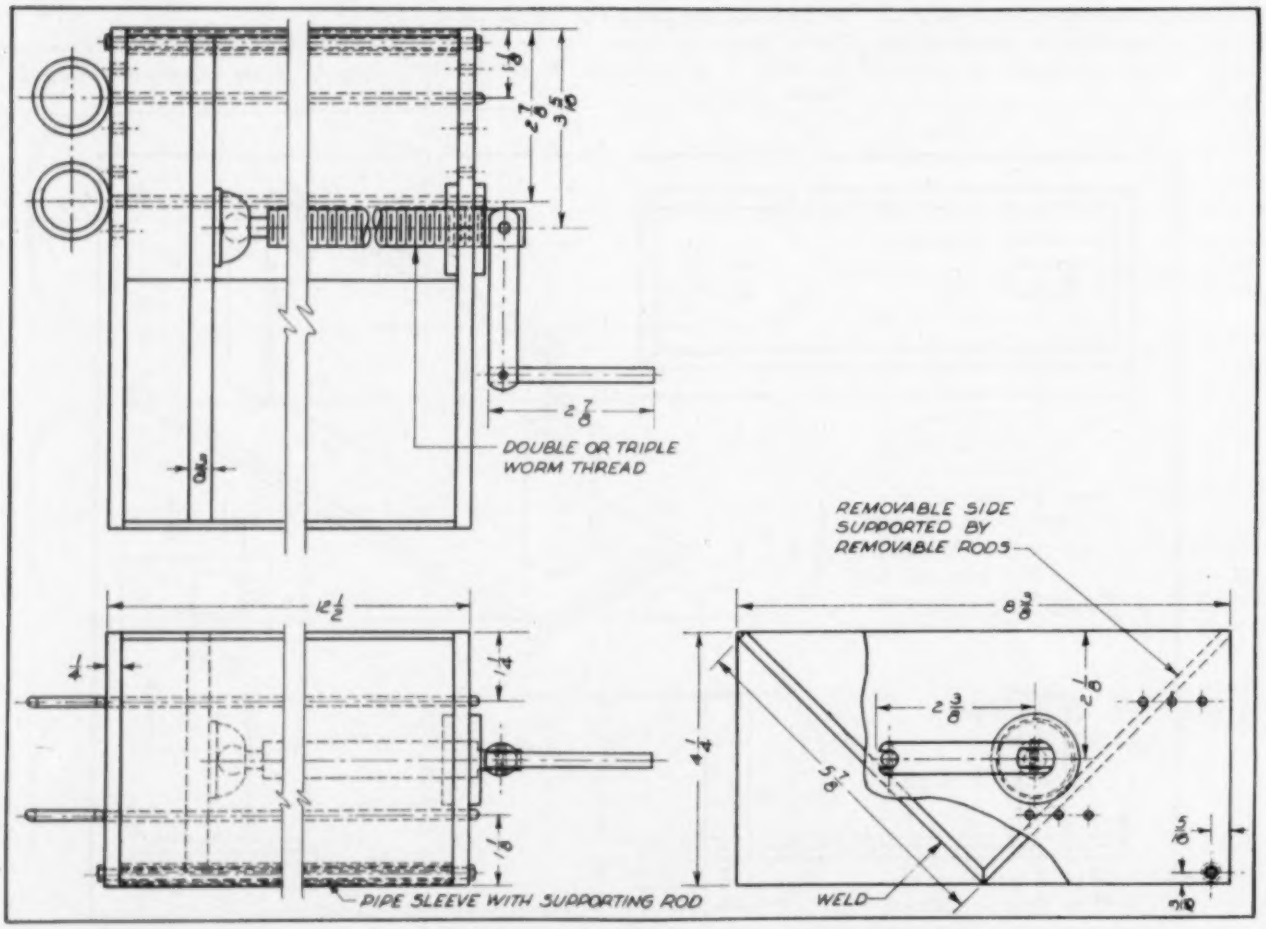
The construction of this device can be accomplished in any school machine shop.

No. 12 or 13 n.c. thread and nuts may be substituted for double or triple thread.

The screw does not have to be over 4 in. long since the machine is usually full until the



How padding machine is used



Padding machine

final operation when blocks of wood are used for filling in space.

The pipe sleeve with the supporting rod may be any size with a nut on one end, or the rod may be peened on both ends.

Details have been omitted to allow for flexibility in sizes of rods, screw, nut, etc.

The half tone shows an assembled machine with loose papers; another machine with papers clamped in place with rods and side removed ready for spreading the glue; and still another with the glue spread and drying.

Four small flush bolts could be welded to the removable plate and co-ordinated with the proper size holes in the end pieces; thus the removable rods could be eliminated.

SWIVEL KNIFE

RAYMOND B. COLE
Craft Instructor
El Monte High School
El Monte, Calif.

Leather carvers know that more practice is required with a well-sharpened swivel knife, to acquire skill, than with any other leather carving tool. Instructors are aware that it is impossible to keep swivel knives sharp if they are used by several students each day.

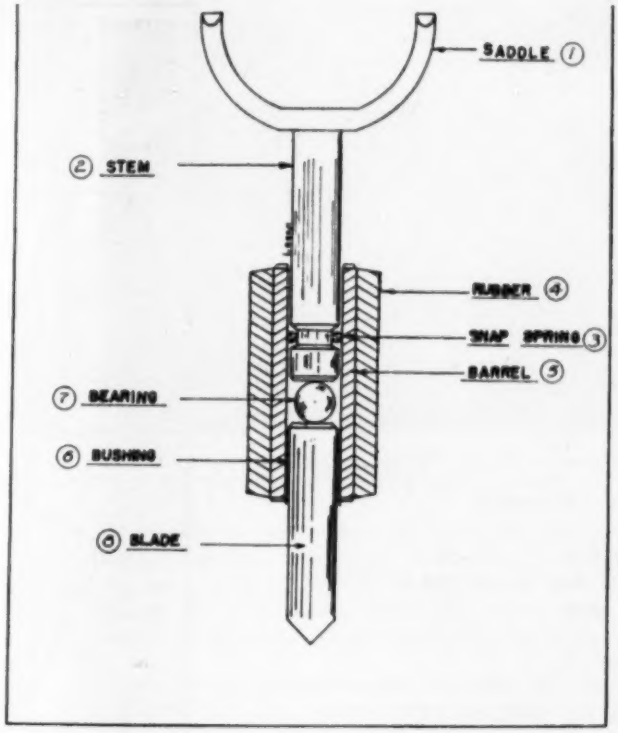
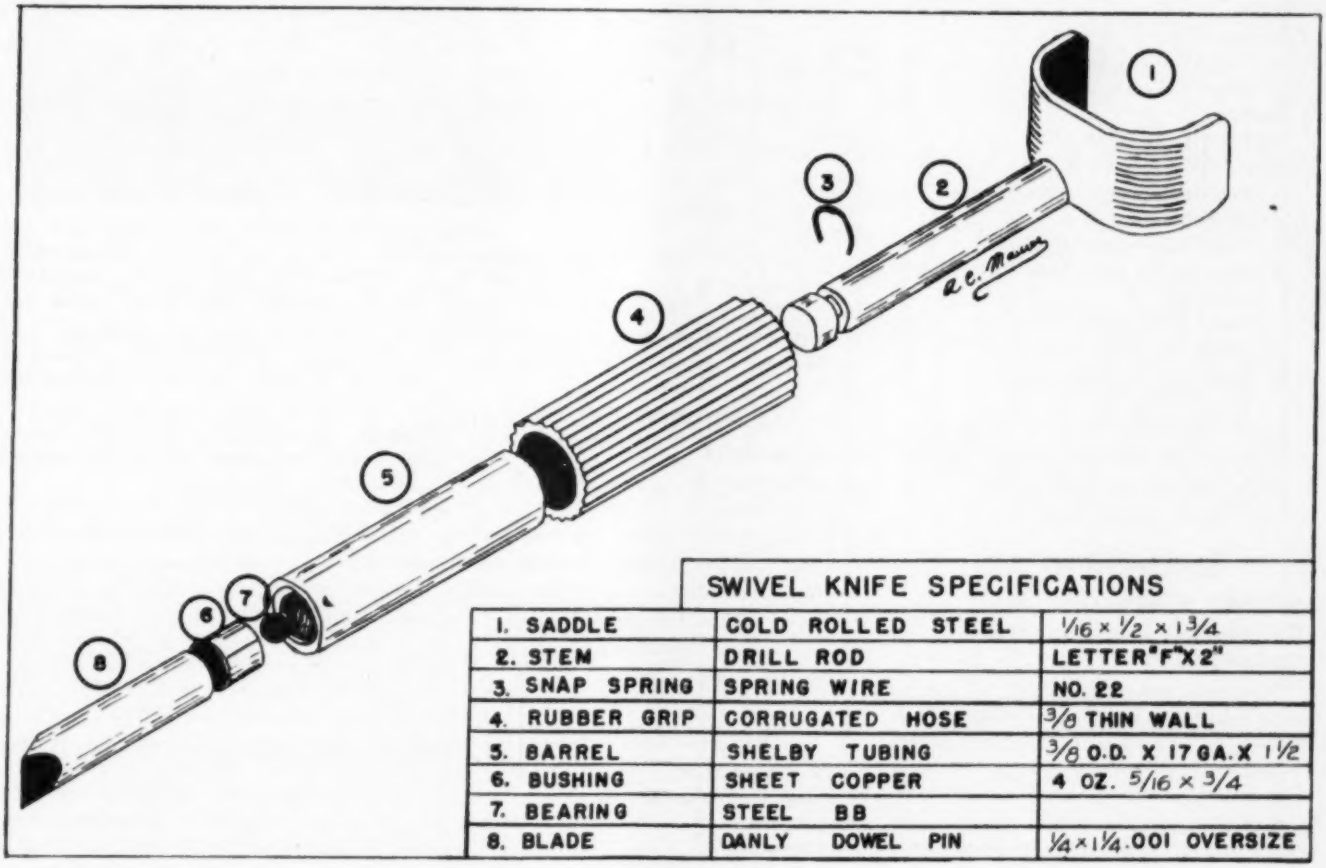


Fig. 2. Assembly of swivel knife



SWIVEL KNIFE SPECIFICATIONS

1. SADDLE	COLD ROLLED STEEL	1/16 × 1/2 × 1 3/4
2. STEM	DRILL ROD	LETTER "F" X 2"
3. SNAP SPRING	SPRING WIRE	NO. 22
4. RUBBER GRIP	CORRUGATED HOSE	3/8 THIN WALL
5. BARREL	SHELBY TUBING	3/8 O.D. X 17 GA. X 1 1/2
6. BUSHING	SHEET COPPER	4 OZ. 5/16 × 3/4
7. BEARING	STEEL BB	
8. BLADE	DANLY DOWEL PIN	1/4 × 1 1/4 .001 OVERSIZE

Fig. 1. Details of swivel knife

With limited budgets it is impractical to purchase swivel knives for each student.

To solve these problems, I have designed a swivel knife from standard stock materials which can be made by each craft student at a nominal cost and with a minimum of equipment. The swivel knife as a craft project includes many good *Doing* and *Knowing Units*.

The following procedure and drawings will aid the student in fabricating the swivel knife.

Tools	*Materials*	
file	saddle	spring
hacksaw	stem	solder flux
soldering torch	barrel	emery cloth
grinder	rubber grip	sandpaper
drill press	blade	rouge strap
pliers	bearing	
oilstone		

Procedure

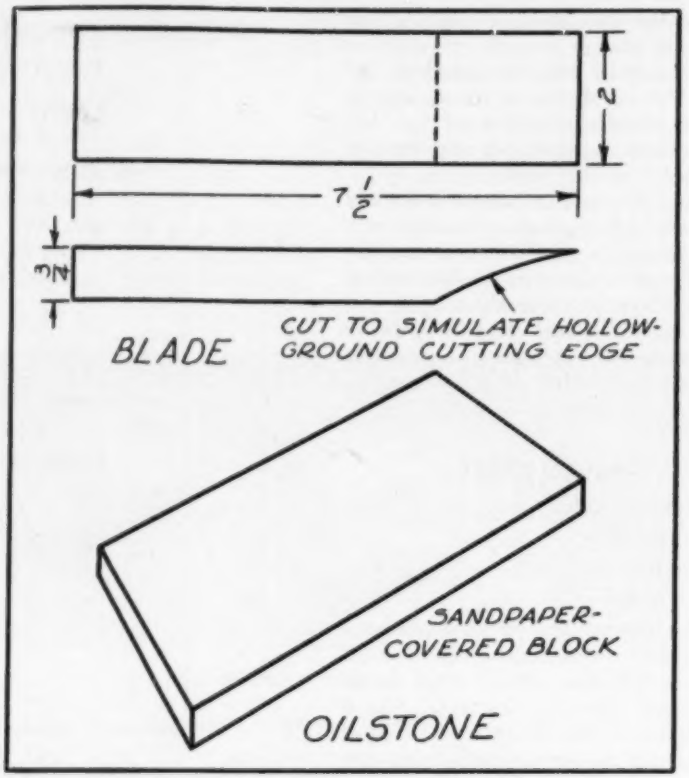
1. Saddle
   a) File corners.
   b) Bend to shape, smooth, and polish with emery cloth.
2. Stem
   a) File ends flat.
   b) Insert in drill press and cut spring groove with hack saw while rotating.
3. Barrel
   a) File ends flat.
   b) Ream ends with countersink.
4. Rubber grip
   a) Sand to proper length.
   b) Bevel the edge.
5. Bushing
   a) Form to fit barrel.
6. Spring
   a) Form spring to fit spring groove.
7. Assembly
   a) Silver solder stem to saddle.
   b) Form saddle over round stake, polish, and buff.
   c) Insert bushing into barrel.
   d) Drive blade into barrel 3/8 in.
   e) Insert spring into groove.
   f) Install rubber grip.
   g) Oil stem and barrel.
   h) Insert bearing and stem into barrel.
   i) Grind blade to 30-deg. angle.
   j) Hone and strop.

SHARPENING AID

WHITNEY B. NEWCOMB, JR.
Gorham State Teachers College
Gorham, Me.

Here is a very simple aid for showing what happens to a plane iron or chisel blade while it is being whetted. The only materials necessary are a few scraps of pine and some fine sandpaper.

One piece of pine which represents the blade may be used repeatedly by re-cutting the concave surface and replacing the wire edge by sanding with coarse paper when necessary.



Teaching aid for showing how to sharpen chisels

The bevel may be shaped by cutting on a band saw or jig saw. Rubbing the beveled edge on the simulated oilstone creates a large and very obvious wire edge which may be removed by regular whetting movements of the blade on the oilstone. The curved surface may be first darkened with graphite to show the action of the stone on the heel and toe of the bevel. The bevel is large enough to show very obviously how it should rest on the stone.

A FINGER SAVER

R. L. GRANDLE
East High School
Wichita, Kans.

When you have a very small or narrow strip of wood to rip on a power saw, use an ice pick as a pusher to push the material through the saw. I learned this trick from an old-time cabinetmaker and I think it is worth passing on.

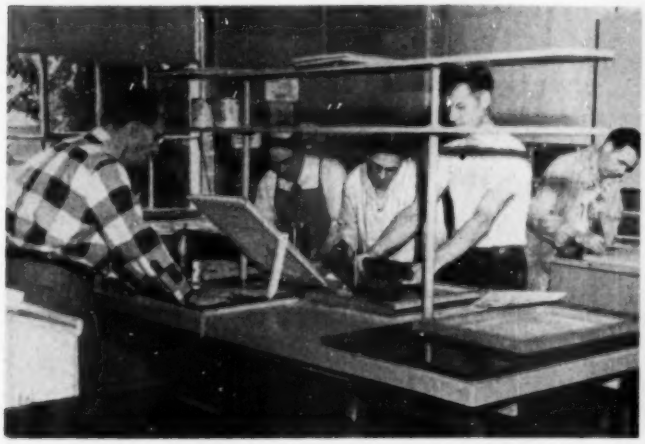
CLINIC CLIPPINGS

H. A. PEDERSON
Director, Industrial Arts Division
State College
Platteville, Wis.

"It was a success." "Have it again next summer." This was the verdict of those who attended the industrial-arts clinic of the industrial-arts division at State College, Platteville, Wis., July 14–18, 1952.

Experienced industrial-arts teachers from various areas in the state attended for the full week. The entire group attended demonstrations in various areas the first day and evening. These demonstrations were in graphic arts, phases of woodworking, wood carving and finishing, welding, plastics, art metal and leather working. The days following were more informal. The men worked in the area or areas of their interest or where they felt a need for upgrading. Evening sessions were highlighted with first-class commercial demonstrations in finishing and welding followed by questions and discussion.

What are some of the values of a short intensive clinic? Many men with family obligations find it very difficult to attend a six- or eight-week summer session. They can, however, spare a week and it is possible to get 40 or more hours of work in during the week. Another advantage is that they can learn precisely what they want to learn under expert guidance. Moreover, working closely with a group of fellow teachers for an intensive week develops new and enduring friendships. Then, too, some men develop interest in areas that they weren't interested in when they arrived. To illustrate, one member who was primarily interested in art metal spent much time in



At work in graphic arts. Left to right: C. A. Wackman, Racine, Wis.; Fred Short, Norris Foundation, Wis.; E. W. Manzer, instructor; R. E. Wilson, Eau Claire, Wis.; W. E. Netterblad, Stoughton, Wis.

Back row, left to right: James Schilleman, Antigo, Wis.; Lester Sonn, Middleton, Wis.; J. P. Benham, Cleveland, Ohio; Robert Hartig, La-Crosse, Wis.; Kurt Grimm, Hartland, Wis.; R. E. Wilson, Elcho, Wis.; M. A. Slack, Kewaunee, Wis.; and C. A. Wackman

Middle row: Francis Steiner, Granton, Wis.; W. E. Netterblad; B. C. Hagen, Manitowoc, Wis.; G. A. Todd, Racine, Wis.; Fred Short; Robert Helm, Waukesha, Wis.

Seated: William Biss, Cornell, Wis.; H. C. Olson, Platteville, Wis.; E. W. Manzer; H. A. Pederson, Platteville, Wis.; C. S. Johnson, Platteville, Wis.; H. W. Priebenow, Richland Center, Wis.

Not in picture: M. G. Dahlen, Solan Springs, Wis.; Garth Tubbs, Bagley, Wis.; and Lynn Cherrier, Lancaster, Wis.

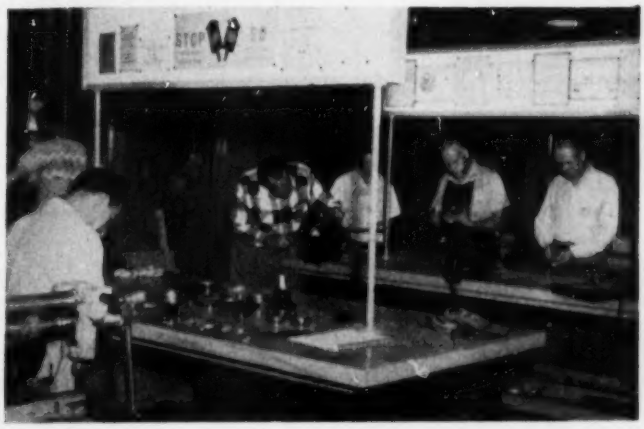
that area, but learned many basic fundamentals and made two articles in leather. There were several instances of this kind. Thus we may say that a clinic broadens one's interests and capabilities in the industrial-arts field.

SAFETY SHIELD FOR SHARP TOOLS

RALPH L. KYKER

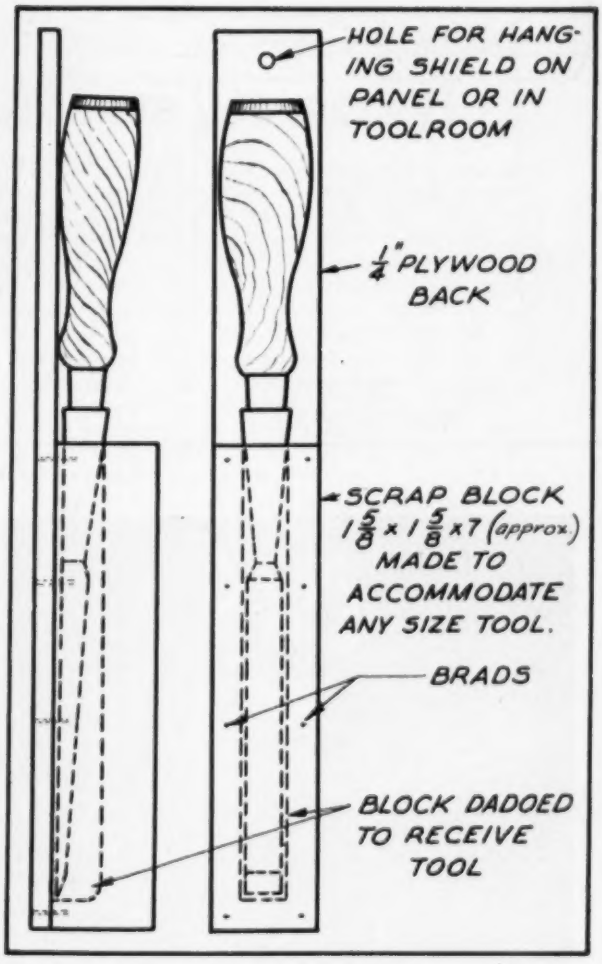
Fresno, Calif.

The carrying of sharp, unprotected tools through a busy shop is a serious hazard, whether it be undertaken by a stumbling adolescent, or



At work in art metal. Left to right: Kurt Grimm, James Schilleman; C. A. Wackman; Robert Helm; G. A. Todd; B. C. Hagen

by an adult. A slick floor, a hurried student, or any one of many human errors can turn a sharp, efficient tool into an equally efficient instrument for injury. No one can eliminate the danger, nor can any special way of holding an unprotected tool, however meritorious, remove its edge, or in any manner render it harmless.


HOLE FOR HANGING SHIELD ON PANEL OR IN TOOLROOM
1/4" PLYWOOD BACK
SCRAP BLOCK 1 5/8 x 1 5/8 x 7 (approx.) MADE TO ACCOMMODATE ANY SIZE TOOL.
BRADS
BLOCK DADOED TO RECEIVE TOOL

Tool safety shield

What, then, can be done to remove a hazard that is present in almost every school shop? Few schools can afford the luxury of a separate bench and tool panel for each student, but there are few instructors who cannot afford to devote a few hours to the making of a safety shield that is easily constructed, costs little, and is practically foolproof.

The accompanying illustration of a proposed shield shows how it may be hung on a panel or in the toolroom. The shield pictured is used to sheath a chisel and is made entirely of wood. Shields of similar design may be made of leather, canvas, plastic, and many other materials, and designed to shield every type of sharp and pointed tool. By using the shield, the tool will be guarded at all times except when in actual use, thereby reducing the chances for accidents to a minimum.

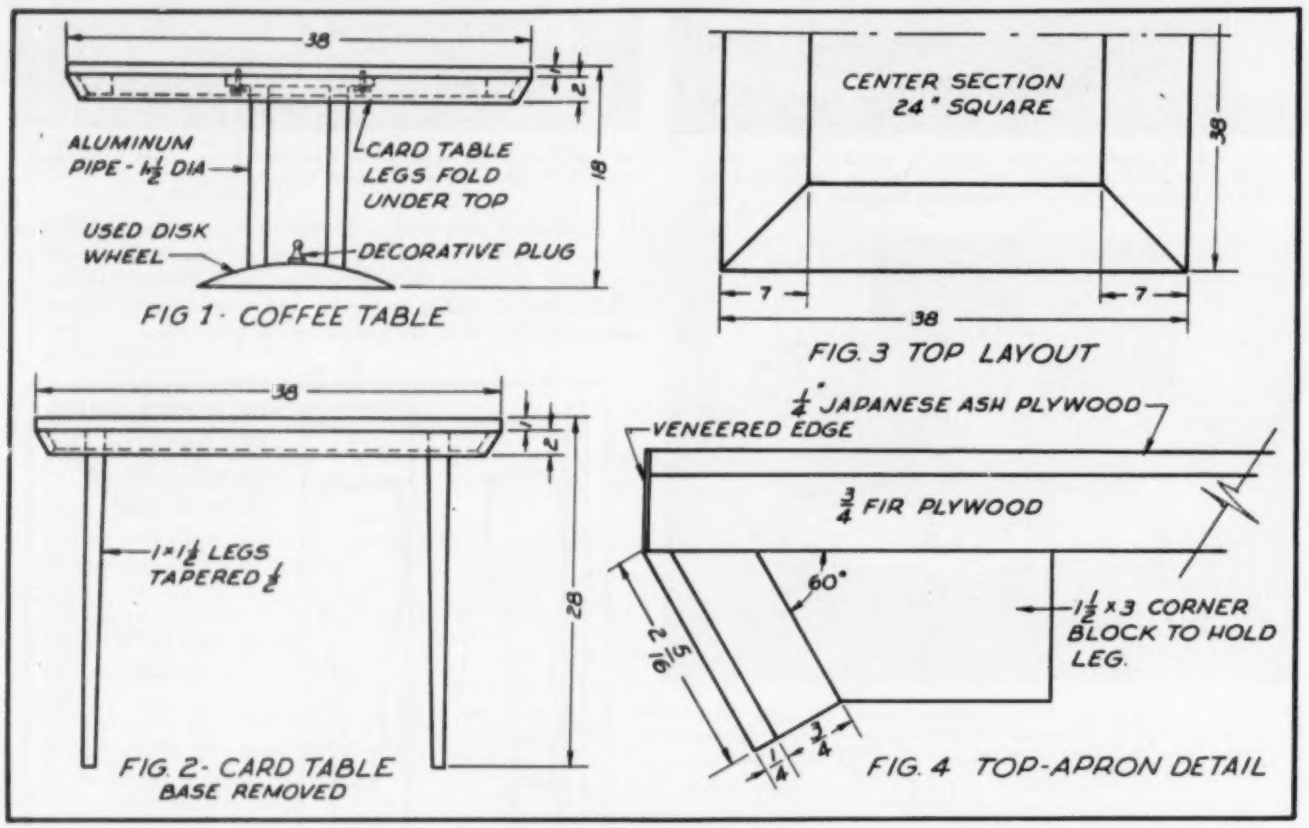
DUAL-PURPOSE COFFEE TABLE

WILLIAM F. HOLTROP

Assistant Professor, Industrial Education
University of California
Santa Barbara College
Santa Barbara, Calif.

The modern trend toward large coffee tables poses a problem for the hostess who is planning a card party or a buffet supper. The

(Continued on page 24A)



Details of dual-purpose coffee table

Coffee table

Card table

Here's what A-V experts say about Pageant pre-lubrication

"Schools, churches, and other groups which use movie projectors are interested in one thing—a machine that is always ready to go. We have found that improper oiling causes most of the trouble that spoils showings. The Pageant's permanent pre-lubrication totally eliminates the problem!"

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"Our service records prove that faulty lubrication *is* the No. 1 'gremlin' in projector breakdowns. Permanent lubrication keeps Pageants operating for longer periods between servicing and relieves people responsible for them of one more important detail."

Glen R. Frank
Culver's
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"It's the BIGGEST NEWS IN YEARS—no more oiling of projectors! Lack of lubrication really means trouble and big repair bills for the user . . . overlubrication means unnecessary service and cleaning."

Rae Kraft Birch, Pres.
Photoart Visual Service
Milwaukee, Wisconsin

"Schoolteachers and administrators in my area agree on one thing: They want a projector that requires as little maintenance as possible. The permanently pre-lubricated Kodascope Pageant Projector has certainly proved to be the ideal answer, and we are happy to recommend it!"

J. E. Lewis
Lawrence Camera Shop
Wichita, Kansas

There's a "plus" in the Pageant that will save you money!

No matter how well a projector is designed, agree audio-visual experts, over- or underoiling accounts for more projector breakdowns . . . for more out-of-service time . . . for more expense in maintenance . . . than any other single cause. But lubrication is *never* a problem with a Kodascope Pageant Sound Projector. Every one of Kodak's complete line of Kodascope 16mm. Projectors is *permanently* pre-lubricated at the factory—an exclusive 16mm. Kodascope feature that eliminates completely this chief cause of wear and damage to projection equipment.

The projector shown in an art-instruction class, above, is the standard Kodascope Pageant Sound Projector—the economical first-choice machine for all-around sound-and-silent projection in classrooms and assembly halls. Permanent pre-lubrication is just one of the important benefits this fine projector affords. You'll find that it screens films with exceptional sharpness and brilliance . . . that it reproduces sound with amazing high fidelity . . . and that its light weight and simplified design make it truly outstanding in ease of operation.

The standard Pageant lists at $400 with 8-inch speaker in a single easy-to-handle case. For full information about the Pageant . . . or any of the other projectors in the Kodak line . . . call your Kodak Audio-Visual Dealer or mail the coupon below.

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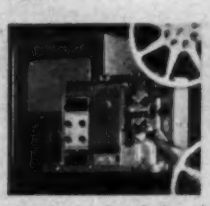

Now . . . Kodak Projectors to meet every 16mm. need

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Please send me name of nearest Kodak Audio-Visual Dealer; also information on the projectors checked:

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(Zone)

Kodak

COFFEE TABLE

(Continued from page 244)

large table occupying so much living room space must then be removed from the room or left to take up the space needed for a card table.

To meet this problem it is not too difficult for the man of the house to design and build his own attractive square coffee table of card table size or somewhat larger. This coffee-card table can be raised to card table height or lowered to coffee table size as the occasion demands, thus eliminating the problem of where to store the card table when it is not in use.

To build the table described and pictured in this article, proceed as follows: Secure a used disk wheel. Discarded disk wheels may be found in almost any farm yard where mechanical equipment is used. (See Figures 1 and 2.) Clean off the rust using a wire buffing wheel or with a coarse wire brush. Grind down the outer edge of the disk sufficiently to keep it from leaving marks on the rugs or damaging hardwood floors. Give it several coats of metal primer and sand it smooth. Black and clear lacquer produce a nice, smooth finish. A strip of felt glued under the rim of the disk gives added protection for the floor.

Four evenly spaced holes in the disk, burned through with a blowtorch, provide for easy placement of the 1½-in. tubular aluminum legs. The center hole may be closed with a decorative wooden plug. Close the ends of the tubes with tight-fitting wooden plugs. Polish the legs with fine emery paper and steel wool and finish with a few coats of clear lacquer. The legs are fastened to a 1 ft. square secondary top which in turn is fastened to the table top by four rail screws with fitting wing nuts.

To make the top use ¾-in. fir plywood and ¼-in. Japanese ash plywood, glued together with waterproof glue. See details, Figures 3 and 4. Glue the 7-in. mitered border directly to the center piece. Cover the edge of the top with a thin layer of veneer resawed from a strip of ¼-in. ash plywood. Fit the apron to the top carefully with compound angles at the corners and glue it into place.

Card table legs fold compactly out of sight under the apron. Good corner blocks, beveled on one side to fit against the apron, make possible the fastening of the leg hinges. The four legs are made of straight grained maple finished in natural color with sanding sealer and lacquer. The top and the apron may be filled with natural or limed oak filler. After this dries apply sanding sealer and several coats of clear lacquer. Rub to a high lustre with lacquer rubbing compound.

To convert the table into a game table simply remove the wing nuts, slip off the base and unfold the legs — the perfect solution to the problem confronting the hostess with limited living-room space.

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above all else in school lathes

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. . . all belts, pulleys, countershafts, gears and motors are completely enclosed. Speed changes and gear-ratio changes are made by external shift levers.

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. . . Timken "Zero-Precision" Tapered Roller Spindle Bearings (the absolute in accuracy) permit student work to ten-thousandths of an inch, and hold this accuracy without constant maintenance.

★SHELDON CONTROLS
SHELDON-taught students are ready to operate standard industrial lathes—are familiar with standard controls and the "big lathe feel".

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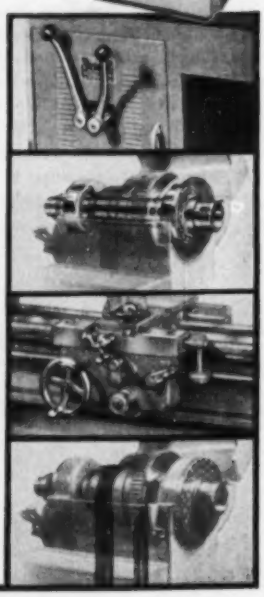
The extra swing and greater collet capacity increase the range of possible student projects—from the "playing store" group to the practical. The extra power to the spindle, the speed range, weight and strength of SHELDON Precision Lathes permit heavy cuts, spinning and demonstration of correct use of new cast-alloy and carbide-tipped cutters.



Built by modern methods, with the finest machine-tool special machinery, on a continuous production line basis, these better lathes cost little more than ordinary school type lathes. *Write for Catalog*

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INDUSTRIAL ARTS AS A PREVOCATIONAL AND AS A PREACADEMIC SUBJECT

J. P. SARTAIN
Industrial Arts Instructor
Greenville, Miss.

A good statement of the objectives of industrial-arts education at the junior high school level is:

Industrial Arts as a Part of General Education:

a) Provides a variety of exploratory experiences for the pupil.

b) Reveals employment opportunities offered by industry.

c) Satisfies the boy's and girl's desire to create useful things.

d) Develops hobby and handy-man interests and abilities.

e) Contributes to the tastes and judgment of the prospective consumer.

(Continued on page 26A)

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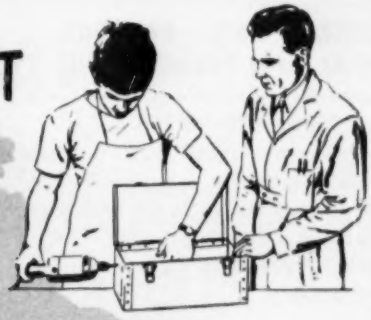
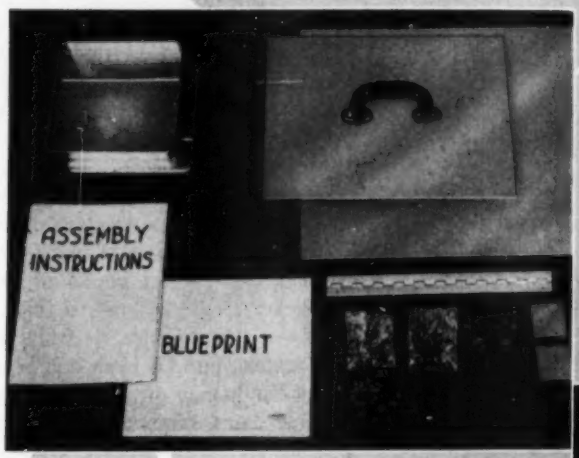
for AVIATION SHEET METAL WORK and AVIATION CONSTRUCTION TECHNIQUES





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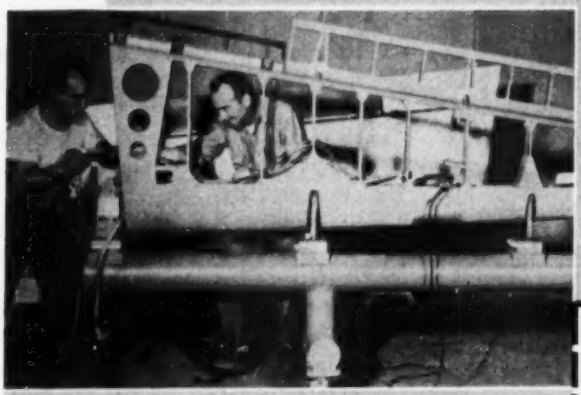
2. A useful product your students will want. Offered to you by the Educational Division of Schweizer Aircraft Corporation, builders of world famous sailplanes and military aircraft components.

1. Effective Teaching Medium—Kit includes blueprint, assembly instructions, and all materials including preformed ends and hardware. Complete project worked out and proven in schools. Requires no preliminary instructor preparation. Only common hand tools required.

2. Useful End Product.—A practical multi-purpose Utility Case, durable, lightweight, extremely attractive, size 17" x 8" x 8". Just the thing for fishing gear, tools, camera equipment, roller skates, sports gear, picnic box, laundry case and scores of other uses. Optional related background material available for instructors in the form of instruction manual and material for demonstration and practice.



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INDUSTRIAL ARTS — PREVOCATIONAL AND PREACADEMIC

(Continued from page 24A)

f) Develops interest and ability in home repair and maintenance.

g) Affords practice in safety related to the school, home, and industry.

h) Gives opportunity for co-operative effort in groups.

i) Illustrates and vitalizes the academic subjects.

The industrial-arts program in the E. E. Bass Junior-Senior High School at Greenville has been built upon and around these objectives. The over-all program accomplishes many of them fully, and others partly.

The program embraces, in the seventh and eighth grades, a variety of areas in the industrial-arts shop. The seventh-grade shop consists of freehand drawing, leathercraft, plastics, and electricity. The eighth-grade shop consists of freehand drawing, woodwork, machine shop, and sheet metal. Shop is required of all boys in both the seventh and eighth grades and, therefore, affords exploratory experiences in a variety of trades.

A portion of each week is devoted to classwork where the student is acquainted with employment opportunities in industry. In many cases, field trips to the actual industries or shops in town make the work in the shop much more interesting to the student, and create student interest in that particular industry.

All projects made in the shop are of a useful nature. The students are given a limited choice of projects, with the idea in mind that student choice of projects creates interest in the work. If the student is allowed this privilege, he will take the same interest into his home and become a sort of handy man or, as has been proved in many cases, begin a hobby along the lines of his major interest in the shop. These handy-man and hobby activities have proved to be a useful leisure-time activity.

After actual contact with materials and comparing these materials, the student develops a sense of value as a consumer. He is taught to compare products and buy more intelligently. Along this line, he also learns to appreciate and understand qualities of good workmanship. He learns that the most economical buy is the one in which he receives quality and good workmanship.

Sessions of safety are held in the class lectures. The student is taught that the safest way to perform an operation is the correct way. This principle holds true in shop, classroom, home and industry. Training of this sort has proved useful in the chemistry lab.

Group projects are sometimes assigned for the specific purpose of teaching co-operation. Developing the ability to get along with others and to co-operate has been a definite part of shop training.

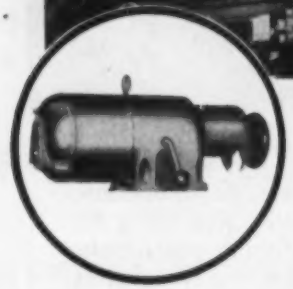
Individual responsibilities such as tool checker or bench sweeper are assigned to develop responsibility on the part of the student. Each student is required to perform this individual duty each day as well as carrying on his project work.

Each project has a definite order of

(Continued on page 28A)

modernize your machine shop now

install America's no. 1 machine tool drive...



Progressive schools everywhere are selecting LIMA DRIVES to modernize their present lineshaft driven machine tools — economically.

Photo above shows the installation of LIMA GEARSHIFT DRIVES at the Syracuse Vocational High School, Syracuse, New York.

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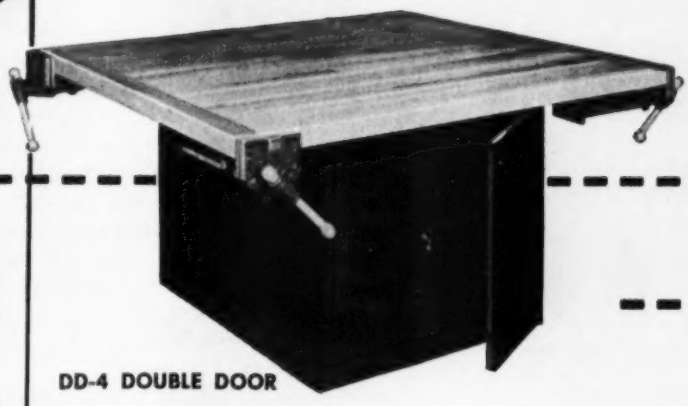
WOOD WORKING BENCHES

L-4 LOCKER TYPE



DD-4 DOUBLE DOOR

4 WORK STATIONS

The extra big size—64" x 54"—of both these woodworking benches furnishes ample working space for four students. Each of the four corners is equipped with a strong 5CD Columbian vise.

EXTRA LONG SERVICE

Specially constructed 2¼" solid maple top provides long years of sturdy service. The vise ends of each bench are reinforced with heavy 5" battens firmly bolted for solid foundation.

SPACE SAVERS WITH PLENTY OF SPACE

Base of each bench is recessed providing maximum work area with minimum floor space. Bases are of heavy gauge metal attractively finished in olive green enamel. Interiors furnish ample storage space.

IMMEDIATE DELIVERY ON BOTH

These Woodworking Benches are the only ones of their kind — made exclusively for B/G. They have proved instantaneous hits in schools adopting them. . . . A real investment in efficiency, economy, and assured long service.

THESE are America's two outstanding Woodworking Benches. Each one offers all the important features listed to the left. The only difference between them is that the L-4 Locker Type has 12 individual storage lockers, numbered and equipped for padlocks, while the DD-4 Double Door with only a horizontal dividing shelf provides more bulk storage area. Select the one that best suits your school's needs, and order it today.

With its more than 15,000 most needed, most wanted pieces of equipment, machines, and school supplies the big B/G Master Catalog is your easiest, most convenient buying guide. Use it regularly for the added savings of time and money of one source of buying. Write today for your copy.

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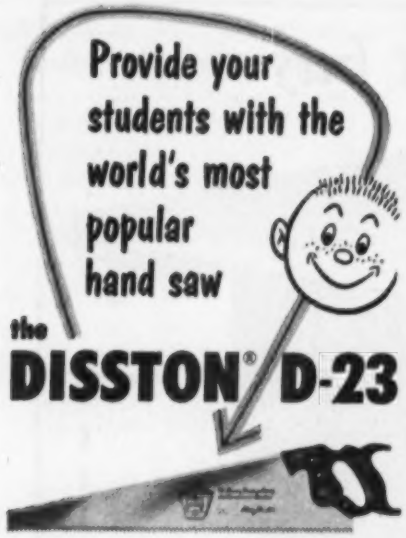

Here's a fine saw that will help any student do better work. It's the choice of millions—and no wonder! The famous Disston D-23 is made of Disston's own saw steel. It is true taper ground, accurately filed, carefully set, beautifully finished.

And there's a bonus to the school that chooses this fine saw—or any Disston tool! Disston saws and tools serve longer, need fewer replacements. Keep DISSTON in mind when you make your next requisition!

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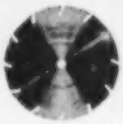

D-3200 Deluxe Circular Saw A hollow-ground combination saw. One of a *complete* line of circular saws for all bench and portable machines.

No. 368 Hack Saw Frame Streamlined, efficient design, comfortable grip, rugged frame. Adjustable blade position.

No. 4 Compass Saw Reversible blade of Disston steel, hardwood handle. Takes interchangeable 12" and 14" blades.

No. D-1-5 Chisel Set High-carbon steel chisels and gouges, hardwood handles. The finest set of its kind ever offered.

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INDUSTRIAL ARTS — PREVOCATIONAL AND PREACADEMIC

(Continued from page 26A)

work, which the student must follow. This develops in the student a desire for a definite plan in his work, regardless of its nature.

Each project must meet a certain set standard suitable to students at this age level. If each student is held to a certain degree of accuracy he will tend to meet this standard in other classes.

Training of this nature is carried over into the classroom. Cases have been cited in which a student has shown marked progress in other courses when his shop interest has been increased or when he has found a major interest.

Standards of accuracy and order of procedure have been helpful in other courses such as algebra and English. They help the student to plan his work and then prepare that work to the best of his ability.

Mechanical drawing teaches the student accuracy as regards very small units. The student learns to visualize objects, handle figures mentally, and transfer dimensions or views from one object to another. This training of the mind will definitely influence the student's thinking and ability to progress in other classes. He learns to think and work very accurately. Therefore mechanical drawing has a definite carry-over value into the other classroom subjects.

Industrial arts as a prevocational subject has certainly proved its value. The variety of exploratory experiences, along with the other objectives which are met, enable the student actually to engage in the activities of the various trades, learn the advantages and opportunities of those trades, compare them and select that one in which he is most interested and in which he thinks he can do his best work. From these industrial-arts classes, the need for other experiences has been shown by the request for shopwork in other vocations. This alone is ample evidence of industrial-arts value as a prevocational course. And the growth of industry in Greenville is presenting a great opportunity to those possessing vocational interest.

After two years in the industrial-arts shop, those students who have discovered their main interest begin to study and prepare along their chosen lines. Each

(Continued on page 29A)

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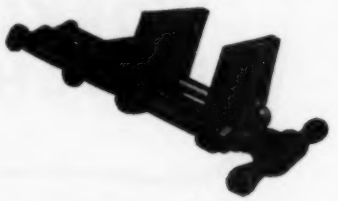

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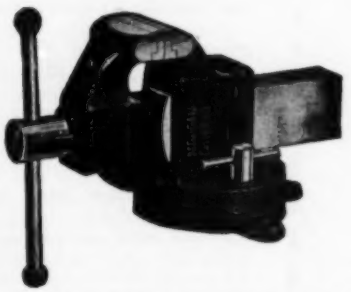

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INDUSTRIAL ARTS — PREVOCATIONAL AND PREACADEMIC

(Continued from page 28A)

student may choose the classroom subjects which meet his needs, whether they be academic or vocational.

If the student desires vocational preparation, he may enter the Type-B machine shop, enroll in mechanical drawing, and/or enroll in the diversified occupations program. This would, of course, all be accomplished in the four years of high school and not in any one or two years.

If the student's main interest should be other than a vocation, he may choose courses in high school to provide training in that field. A student desiring to enter engineering, medicine, law or any other field will have found his interest and can begin to prepare toward that end.

Regardless of choice of profession, the industrial-arts program provides training and experiences that are useful and aid the student in progressing in that field. The student is taught to think problems through, reach a definite decision, plan a course of action, foresee as far as possible any faults with that plan of action, and proceed toward his goal at a pace which will enable him to attain his highest standard of performance.

ABBREVIATIONS USED IN CARPENTRY

ERNST H. SUERKEN

Supervising Principal
Union Free School District, Greenburgh Number Eleven
Dobbs Ferry, N. Y.

The following abbreviations are used by carpenters in relation to lumber:

A

A.D. — air-dried
av. w. — average width
av. l. — average length

B

bd. — board
bd. ft. — board foot; that is, an area one square foot by one inch thick
bdl. — bundle
bev. — beveled
b.m. — board (foot) measure
btr. — batter

C

clg. — ceiling
clr. — clear

(Continued on next page)

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☐ STUDENT'S DESK
☐ CHEST OF DRAWERS
☐ TWO-DOOR CABINET
☐ 15′ SAILBOAT
☐ 20′ SAILBOAT
☐ 11½′ FLAT BOTTOM SKIFF
☐ 9′ FLAT BOTTOM DINGHY
☐ 8′ PRAM DINGHY
☐ 13½′ OUTBD. RUNABOUT
☐ 13½′ INBD. RUNABOUT
☐ FLEXIBLE STORAGE WALL
☐ UNDER-EAVE STORAGE
☐ SHELF-DOOR WARDROBE
☐ SECTIONAL STORAGE WALL
☐ CHILD'S STORAGE WALL
☐ ISLAND ENTRY WALL
☐ MUSIC WALL
☐ OUTDOOR STORAGE WALL
☐ CARPORT STORAGE
☐ GARDEN CABINET
☐ PATIO FURNITURE
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ABBREVIATIONS USED IN CARPENTRY

(Continued from previous page)

CM. — center matched; that is, tongue and groove joints are made along the center of the edge of the piece.
com. — common
csg. — casing
ctg. — crating
cu. ft. — cubic foot

D

D & CM. — dressed (one or two sides) and center matched
D & M. — dressed and matched; that is dressed one or two sides and tongued and grooved on the edges. The match may be center or standard.
D & SM. — dressed (one or two sides) and standard matched
D2SM. — dressed two sides and center matched
D2S & M. — dressed two sides and standard matched
dim. — dimension

E

e — edge

F

FAS. — first and seconds, a combined grade of the two upper grades of hardwoods
f. bk. — flat back
fcty. — factory (lumber)
F.G. — flat grain
flg. — flooring
f.o.k. — free of knots
frm. — framing
ft. — foot or feet. One accent mark (') is also used.

H

hdl. — handle (stock)
hdw. — hardwood
hrt. — heart
hrtwd. — heartwood

I

in. — inch or inches. A pair of accent marks (") is also used.

K

KD. — kiln-dried
k.d. — knocked down

L

lbr. — lumber
lgr. — longer
lgth. — length
lin. ft. — linear foot, that is 12 inches.
L.R. — log run
Lr. MCO. — log run, mill culls out

M

M. — thousand
MCO. — mill culls out
merch. — merchantable
M.R. — mill run
M.s.m. — thousand (feet) surface measure
m.w. — mixed width

N

No. — number
1 s & 2 s — ones and twos, a combined grade of the hardwood grades of first and seconds

O

ord. — order

P

P. — planed
pat. — pattern
pln. — plain, as in plain sawed
pn. — partition

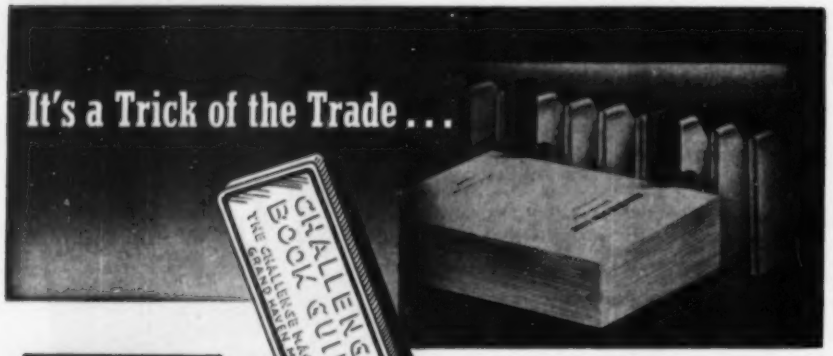
Q

qtd. — quartered with reference to hardwoods

R

rd. — round
rdm. — random
res. — resawed
rfg. — roofing
rfrs. — roofers

(Continued on page 32A)



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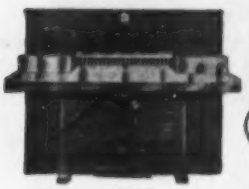
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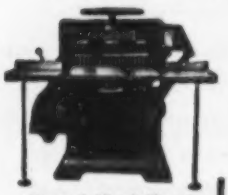
Diamond (Hand Clamp) Power Cutter

Challenge 265-305 Lever Cutter

Challenge 265-305 (Hydraulic Clamp) Power Cutter

Challenge Pony Lever Cutter

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ABBREVIATIONS USED IN CARPENTRY

(Continued from page 30A)

rip — ripped
r.l. — random length

S

S & E. — surfaced one side and one edge
S1E. — surfaced one edge
S1S1E. — surfaced one side and one edge
S1S2E. — surfaced one side and two edges
S2C. — surfaced two edges
S4S. — surfaced four sides
S & CM. — surfaced one or two sides and center matched
S & M. — surfaced and matched; that is surfaced one side or two sides and tongued and grooved on the edges. The match may be center or standard.
S & SM. — surfaced one or two sides and standard matched
S 2 S and CM. — surfaced two sides and center matched
S2S & M. — surfaced two sides and standard or center matched
S2S & SM. — surfaced two sides and standard matched
sap. — sapwood
SB. — standard bead
sd. — seasoned
sdg. — siding
sel. — select
S.E. Sd. — square-edge siding
s.f. — surface foot; that is, an area of one square foot
sftwd. — softwood
Sh.D. — shipping dry
ship. — shiplath
sm. — standard matched
s.m. — surface measure
s.n.d. — sap no defect
snd. — sound
sq. — square
sq. E. — square edge
sq. E & S. — square edge and sawed
sqrs. — squares
std. — standard
stk. — stock
S.W. — sound wormy

T

T. & G. — tongued and grooved
TB & S. — top, bottom, and sides
tbrs. — timbers

V

V.G. — vertical grain

W

w.a.l. — wider, all length
wdr. — wider
wt. — weight
wth. — width

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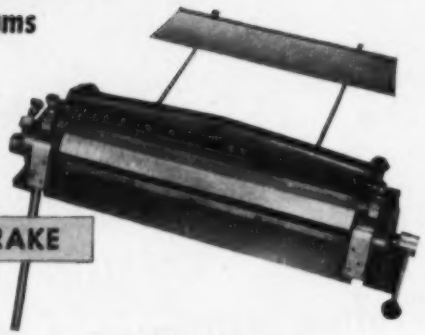

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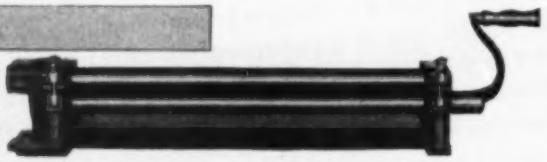
Turning a knob provides infinite adjustment to any angle from 0° to 135°. Forms any size box or pan from ½" to 24" by ¼" graduations. Makes intricate folds, reverse bends and radius bends on sheet steel up to 16 gauge and up to 24" wide. Bending leaf operates on Torrington Needle Bearings. Full 1" clearance between top fingers and anvil. Maximum 2½" box or pan depth permits deeper bends.

24" SLIP ROLL



Finger-tip controls on both ends of top roll permit quick adjustment for any material thickness within capacity of unit. Will accurately roll 24" widths in 20 gauge mild steel—heavier gauges in narrower widths. Removal of work is easily accomplished due to the spring loaded, hinged, top roll. Heavy duty rolls 1½" diameter—distortion proof channel iron base, enclosed gears and oilite bearings are a few of many features.

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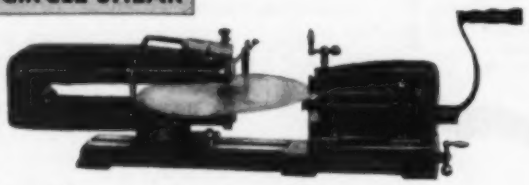

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(Continued on page 35A)

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12	3.15	3.90	1.30	8.35	4.45
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16	3.25	4.10	1.50	8.85	4.75
18	3.50	4.50	1.65	9.65	5.15
24	4.40	5.10	1.95	11.45	6.35
30	4.95	5.75	2.25	12.95	7.20
36	5.75	6.65	2.55	14.95	8.30
42	6.15	7.20	2.75	16.10	8.90
48	7.20	8.40	3.15	18.75	10.35
60	8.30	9.85	3.60	21.75	11.90
72/60	11.75	10.80	5.60	28.15	17.35
72	12.80	11.85	6.20	30.85	19.00
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84	16.45	15.25	7.10	38.80	23.55
96/72	19.60	19.05	7.95	46.60	27.55
96/84	21.25	20.55	10.05	51.85	31.30
96	22.70	21.80	10.95	55.45	33.65
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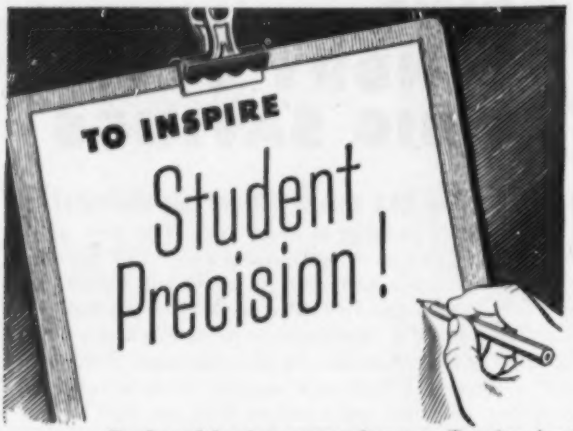

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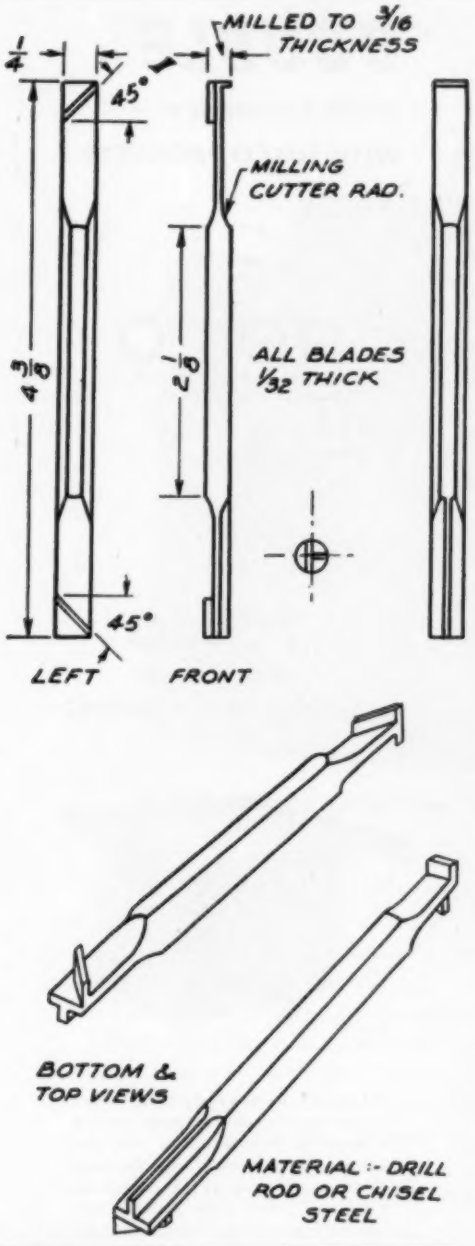
OFFSET SCREW DRIVER

(Continued from page 32A)



milling machine. There is some filing and the usual heat treating to be done in order to complete it. The drawing is self-explanatory and the sequence of operations may be varied to suit the operator. The success of this tool will depend on the success one has in the heat treatment of it. Heat treating instructions for the finished tool should follow the specific recommendations of the manufacturer of the tool steel used. Haphazard heating, quenching, and tempering will result in a useless tool.

PERSONAL NEWS

(Continued from page 9A)

He organized the building trades unit in carpentry in England during 1945-46. This course was taught in a special school to train army personnel who were awaiting return to civil life.

In 1947, Mr. Wilson joined the Curriculum Division, developing Trade and Industrial Training Program Courses for the Los Angeles public school system.

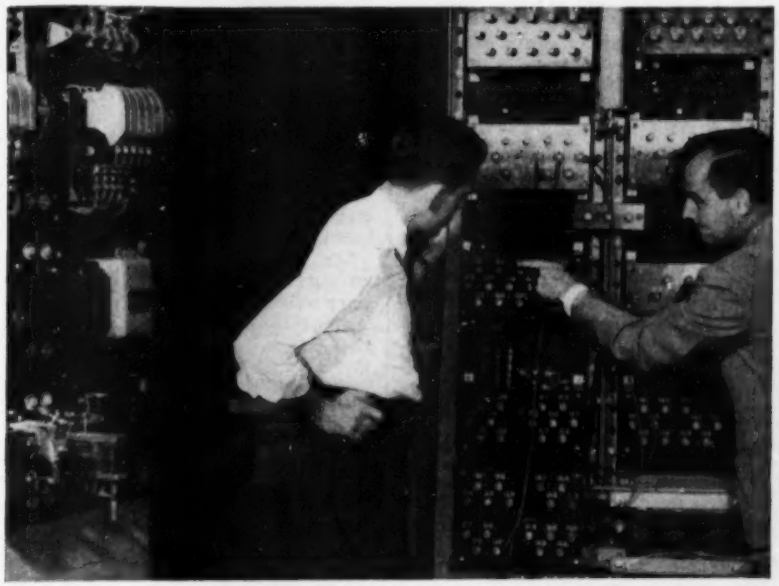
Besides his strenuous work as supervisor and curriculum builder he has found time to write many articles for the professional magazines in his field and he also is coauthor of four books on carpentry and a new book on cabinetmaking and millwork which has just come off the press.

His friends will sorely miss his energetic personality now that he has left the trade and industrial education division of the Los Angeles school system.

CLAUDE E. NIHART RECEIVES CITATION

One of the high lights of the 1953 California Industrial Education Association state convention held in Santa Barbara was the presentation of the first California Ship Citation. The citation was awarded by Ed. Bellezzo, deck officer of The Ship, to Claude E. Nihart. It is in the form of a handsome copper wall plaque inscribed as follows:

(Continued on next page)



Circuit wiring for a-c magnetic control experiment explained by Professor C. H. Dunn of RPI

G-E a-c and d-c magnetic control panels aid laboratory studies at RPI

Designed to provide experience with individual contactors, overload relays, accelerating relays, starting resistors, and autotransformers, General Electric magnetic control panels help students to understand each device, to select and interconnect the right combination for different types of motor starters.

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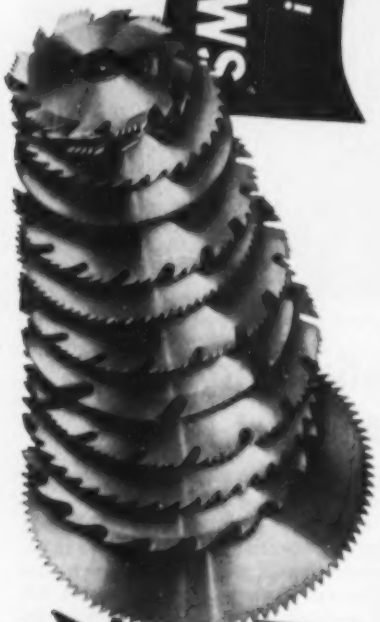
You get Simonds Guaranteed Quality, the buy-word in saws for more than 100 years, at no more than you would pay for regular saws . . . see price list. And Simonds Si-Clone line includes 13 types up to 12" diameter. So get the Si-Clones you need *today* at your local hardware or woodworking machinery dealer.

GUARANTEE: Made of SIMONDS STEEL fully guaranteed against any defect in material or workmanship.



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For Rip, Cut-Off, Easy-Cut and Combination Saws

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8"	. . . . .	10"	. . . . .
. . . . .	$1.75	. . . . .	$2.65
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. . . . .	2.15	12"	. . . . . 4.35

Supplied with Round or Special Shape Holes
As listed in Simonds Catalog "S"

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PERSONAL NEWS

(Continued from previous page)

CITATION
TO
CLAUDE E. NIHART

Craftsman, Master Teacher, Author, and Leader in Industrial Arts and Vocational Education for Your Forty-Five Years of Teaching and Supervising and Your Outstanding Personal Devotion to the Education of American Youth; We of "The Ship" Are Honored to Recognize Publicly Your Distinguished Record.

Members of the SHIP
California Industrial Education Association,
Annual Convention 1953.

SAM T. CRAMBLET RETIRES

He writes: "I think my subscription started in 1921 when I started teaching in New York State — Plattsburg.

"Your magazine has been the one and only professional source of inspiration in teaching industrial arts all these years. I think my classes have made 90 per cent of the shop projects you have printed and a year ago I burned hundreds of pounds of project folders made from pages torn from the magazine.

"I'm now on an extended three year's camping trip in the West, but find time to visit nearly every school shop I run across."

Mr. Cramblet was formerly teaching at the High School at Hempstead, N. Y.

ARTHUR F. HOPPER ENDS SCHOOL CAREER

Arthur F. Hopper, former superintendent of schools and director of the Industrial and Fine Arts Department, retired last June after 38 years of service in the Plainfield, N. J., school system.

Since he first joined the Plainfield school system in 1915 as director of industrial and fine arts, he has served in different capacities including principal of the continuation school, director of educational guidance, evening school principal, superintendent of the entire school system, director of Adult Evening School, and administrative consultant for the past three years.

For 35 years he was director of the Industrial-Arts Teacher Training Program in Rutgers University and was also on the extension division of the university for 25 years, giving courses in administration, supervision, vocational guidance, psychology, and sociology.

Mr. Hopper is a past president of the Eastern Arts Association; and a past president of the Epsilon Pi Tau Fraternity. Last year he received the "Laureate Award" from that national association for the 35 years of distinguished service in the field of industrial-arts education.

He has made many contributions to educational magazines and state monographs and for a number of years was an associate editor of *School News* of New Jersey.

MILFORD M. HAMLIN RETIRES

Milford M. Hamlin retired June 15, 1953, as assistant manager and Central States representative of the Department of Education, American Type Founders, after an association with the company of some 41 years.

Mr. Hamlin first joined American Type Found-

(Continued on page 38A)

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TOLCO
FOUR STUDENT
WOODWORKING BENCHES

The basic Tolco line features 26 models of shop benches and art tables. There is a model to fit every basic need and budget. The splendid TM-12 four student woodworking bench shown has 2¼" hard maple, edge grained, electronically glued top. Tolco tops have more laminations per foot of board width for extra durability and strength. Base is constructed of heavy metal, has 12 lockers. Tolco products are built right today for the thousands of tomorrows they must serve. Why be satisfied with anything less than the finest? Write today for full color illustrated folder of the complete Tolco line.

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Established 1894 — Our 59th Year

New BERGER drafting kit for students will make your teaching job easier... help your classes learn faster

Zips up ALL student's drafting tools in one easy-to-carry case

PATENT PENDING

It's easier to bring all these tools to class than to leave any at home!

With this new, all-in-one drafting kit, your students will really be "present" in class, fully-equipped with every tool they need... every day. Your sessions will get under way promptly. No interruptions by students tapping on their neighbors' shoulders—no piercing whispers begging the loan of a protractor, a triangle, a scale.

The Berger Drafting Kit is complete. It includes: your choice of 8 different sets of drawing instruments, protractor, architect's scale, engineer's scale, 8″ and 10″ triangles, French curve, draftsman's tape, pencils, pencil pointers and erasers. Inner compartments hold drawing and note papers—all in attractive, durable, 16″x 24″ simulated leather carrying case of scuff-proof, waterproof Texon.

Every drafting student in your classes should own this handy, practical learning aid. He'll find it indispensable throughout your course, use it in college and as a professional. You'll find it indispensable as a teaching aid.

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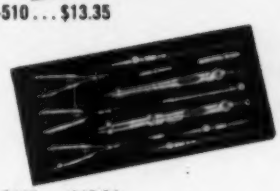
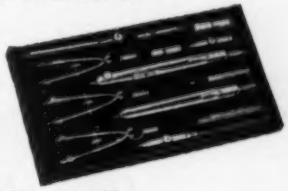
*Prices for complete kit**

T-710A—Super-size bow combination with interchangeable pen, pencil, divider parts. Bow 6½″ long. Circles to 8½″ diameter... **$11.38**

S-510... $13.35



C-2400... $17.34
Available with side wheel bows (S-2400)... **$16.77**



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Quantity	Set No.	Price

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MATERIALS AND EQUIPMENT FOR ENGINEERS, ARCHITECTS, SURVEYORS AND DRAFTSMEN

PERSONAL NEWS

(Continued from page 36A)

ers in 1905, at its Dallas, Tex., branch, where he served in several capacities including that of Traveling Representative. Prior to and after that time he gained a wide experience in the printing, industrial, and business field which served him well in the work he was destined to do for the company in later years.

He became associated with the Chicago branch in April, 1916, and was at that address continually up to his retirement.

He joined the Department of Education, American Type Founders in April, 1935, as midwest representative, and shortly thereafter was appointed assistant manager of the department. His previous technical knowledge of the printing trade, developed with the experience gained while in the engineering department became a valuable asset to the Department of Education in the development of its promotional literature and through the unique assistance he was able to give many schools throughout the central states in the furtherance of printing education.

Mr. Hamlin conceived the idea and developed the charts and graphs as well as wrote the historic and descriptive text for the booklet *Facts About the Printing Industry for Schools*, which bears his name as coauthor. This booklet proved to be excellent guidance material, and around 40,000 copies were distributed over the country. He also created the layout drawings, selected the equipment and materials, and wrote the item specifications for the graphic arts specifications folders which have been unusually helpful to school administrators and printing teachers all over the country.

L. P. ELLIOTT LEAVES PROFESSION

L. P. Elliott, for the past thirty years the supervisor of industrial arts in the Peoria Schools, Peoria, Ill., retired on June 1, 1953. This year completes Mr. Elliott's fiftieth year of teaching.

THE MICHIGAN MASTER TEACHER AWARD

The Master Teacher Award for 1953 was awarded to Warren Small of Detroit, Mich., by the Michigan Industrial Education Society.

The attainments of Mr. Small are not only varied so far as education is concerned but also contain a goodly portion of practical experience. A few of his accomplishments include developing an apprentice program for the Youngstown Steel and Press Company, developing the machine shop courses at both Washington Trade School and Aero Mechanics Vocational High School of Detroit, being assistant superintendent of the machine division at Delco Light of Dayton, Ohio, and being an assistant scout leader and an active civic booster. In addition, Mr. Small belongs to the Michigan Industrial Education Society, the Michigan Vocational Association, the Michigan Education Association, the National Education Association, The American Federation of Teachers, and the Schoolmaster's Club.

John Kovac of Niles, who is chairman of the Master Teacher Award Committee, made the presentation.

♦ The appointment of KARL G. KAFFENBERGER of Rockville Centre as director of the vocational rehabilitation division was announced recently by the State Education Department. Mr. Kaffenberger succeeds the late G. Samuel Bohlin.

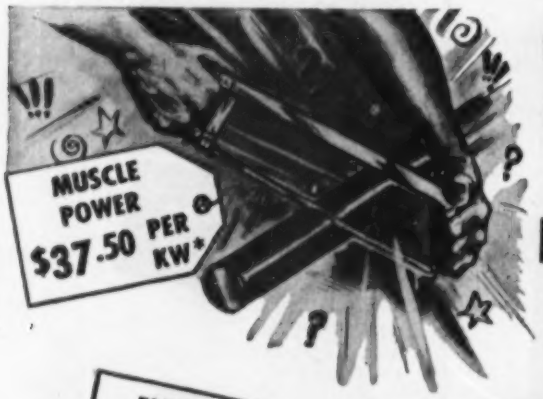
♦ DR. I. DAVID COHEN of Brooklyn, N. Y., principal of George Westinghouse Vocational High School, Brooklyn, and one of the city's leading authorities on vocational schools, died on May 24, 1953, of a heart attack in his country home at Lake Mahopac, N. Y. He was 69 years of age.

Born in this city, Dr. Cohen attended Dartmouth College and Columbia University. He held the degrees of A.B. from the City College, LL.B. from the New York Law School, and master of pedagogy from New York University. In 1904 he became an instructor in the New York public school, and he remained in the school system until his death.

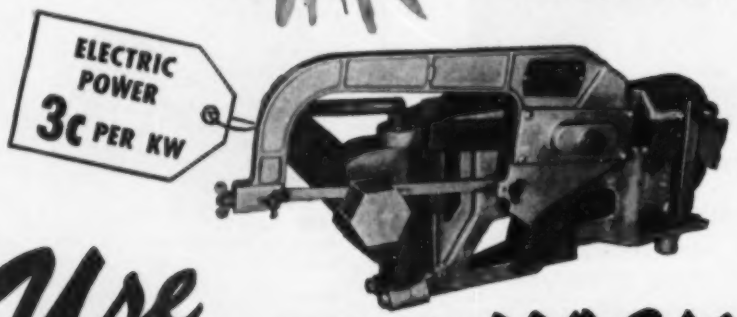
After seven years as an instructor, he was principal for a like period in evening schools. Then, for five years he was principal of the Brooklyn Continuation School; for nine years, 1925–34, principal of the Brooklyn Boys Continuation School; for two years, 1934–36, principal of the Brooklyn Boys Vocational High School. In 1936 he was appointed principal of the Brooklyn High School for Specialty Trades, the name of which was changed in February, 1947, to the George Westinghouse Vocational High School.

♦ DR. HEROLD C. HUNT, superintendent of the public schools of Chicago, Ill., has resigned. He has accepted the Eliot professorship of education at Harvard starting with the fall opening of the school year 1953–54.

(Continued on page 40A)



STOP
Hand Hacksawing
LABOR



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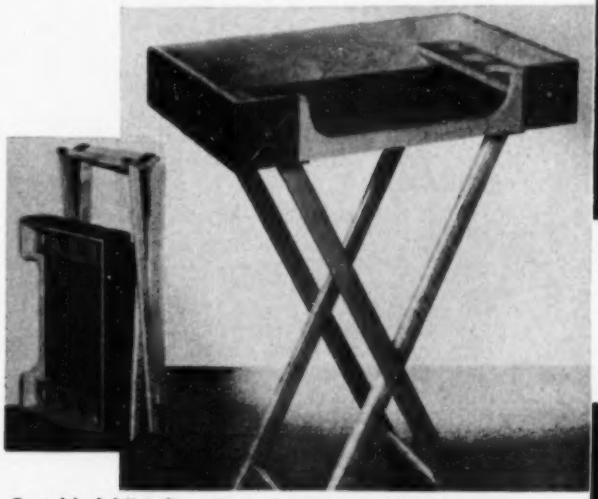
Countless economical uses are limited only by the extent of the imagination. Eight vibrant colors combine and contrast with all color schemes: forest green, lime, gray, red, ivory, beige, tuscan wine and black.



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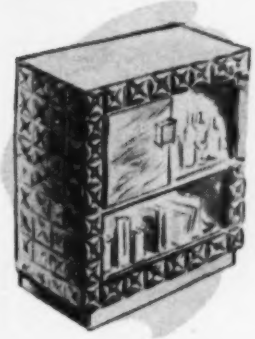

Cabinet-Bookcase

Jewel Box

PERSONAL NEWS

(Continued from page 38A)

♦ BENJAMIN C. WILLIS, formerly head of the public schools at Buffalo, N. Y., succeeds Dr. Herold C. Hunt, resigning superintendent of the public schools at Chicago, Ill.

♦ JOHN G. MILLER, Baldwin, N. Y., a member of the New York University School of Education faculty, received his doctor of education degree during NYU's Commencement exercises in June on the University Heights campus.

An instructor in the department of vocational education industrial-arts division Mr. Miller is also an alumnus of NYU where he received his bachelor of science and master of arts degrees. He has been with the NYU teaching staff since 1941.

Before joining the University faculty Mr. Miller taught at Eastport and Islip High Schools.

♦ DR. VERNE C. FRYKLUND was the recipient of an Outstanding Achievement Award and Medal and an honored alumnus of the University of Minnesota.

♦ DR. G. HAROLD SILVIUS served as a consultant at a Careers Conference held at Nashville Tenn., on March 23–25, and sponsored by the National Urban League of the Tennessee State A. and I. University.

♦ DR. GERALD BAYSINGER was a source person at the South Eastern Area Curriculum Conference held at Waldenwood. Their topic was citizenship.

♦ DR. E. W. FOWLER, associate professor of industrial arts at Eastern State College, Charleston, Ill., and Rex Sullivan, supervisor of trade and industrial education, Montgomery, Ala., were on the industrial education staff at Northwestern State College, Natchitoches, La., for the summer term.

♦ Ronald Baschiere, a graduate of Lane Technical high school, has been awarded the first scholarship under the James S. Kemper Foundation's newly established scholarship fund in the industrial safety option of fire protection and safety engineering at Illinois Institute of Technology, Chicago, Ill.

The scholarship is designed to meet the increasing need for industrial safety engineers in the casualty field.

The fund provides full tuition and book allowances for two four-year scholarships in fire protection and safety engineering.

Any high school graduate who is approved by the Kemper Foundation and is able to meet Illinois Tech entrance requirements, is eligible to receive the award.

The long range scholarship plan will be augmented by summer vacation jobs in the safety engineering field.

News Notes

♦ Establishment of a mechanical engineering scholarship fund at Illinois Institute of Technology, with preference given to candidates living near Rockwell Manufacturing company plants, was announced recently.

Under the fund, one or more scholarships will be awarded to a student ready to enter college. Additional scholarships will be awarded annually. The scholarship will pay full-tuition costs for two years with consideration for additional financial aid after the first two years of college studies.

Applications will be handled by the personnel director, Edward Valves, Incorporated, East Chicago, Ind.; or Rockwell Manufacturing Company, 400 N. Lexington Avenue, Pittsburgh 8, Pa.

The scholarships are established in memory of William W. Crawford, late president of Edward Valves, Inc., by his widow and his son, Mrs. Mona R., and William F. Crawford.

♦ A national monument to Dr. George Washington Carver, Negro scientist, was dedicated on July 14, on the southwest Missouri farm where he was born in slavery.

The 210-acre national park commemorates Dr. Carver's long struggle from slavery to fame as an agricultural scientist who developed more than 500 products from peanuts, sweet potatoes, and pecans.

Douglas McKay, secretary to the interior, delivered the dedicatory address.

♦ Ten students from the University of California at Los Angeles and two from Tuskegee Institute in Alabama are on their way to Bombay, where they will spend the next three months working with Indian students.

The tour is financed by the Ford Foundation and the UCLA University Religious Conference.

♦ The Greer Technical Institute, Chicago, Ill., is offering their newly approved two-year auto-diesel engineering course this fall. Enrollments will be accepted every six months starting on September 14, 1953.

A brochure is available describing the two-year training program in Diesel and automotive engineering.

Anyone interested in further information, write to *Greer Technical Institute, 2230 S. Michigan Ave., Chicago 16, Ill.*

♦ Portland — A complete new listing of all publications put out by the Western Pine Association has been assembled and released, the association announced recently.

Covering everything from hobbyists' wood carving to technicians' research, most of the publications listed are available free of charge for single copies. They include descriptive folders, booklets, teaching aids, how-to-do-it sheets, lumber grade-use guide pamphlets, species books, dealer and consumer publications, grading rules, standard patterns, technical bulletins, and laboratory notes.

The list is dated as of May 1, 1953, and contains six new publications not previously listed.

It may be obtained free of charge by writing for P.L. No. 27, *Western Pine Association, Yeon Building, Portland 4, Ore.*

♦ More than 150 secondary school teachers from nearly all the states and territories came to the University of Colorado campus on July 23, 1953, for the second annual National Aviation Education Workshop sponsored jointly by the university and the Civil Air Patrol, civilian auxiliary of the U. S. Air Force.

For six weeks they will undergo a thorough "air conditioning" designed to familiarize them with every phase of aviation and its economic, political, and sociological impact on this mid-twentieth-century civilization.

Dr. Vervin K. Strickler, aviation educationist with Civil Air Patrol's national headquarters staff in Washington, will direct the workshop.

The workshop grew out of the need for qualified teachers to handle the CAP-high school co-ordinated program which, in 1952, was included in the curricula of 225 high schools and junior colleges throughout the nation as an accredited course.

♦ Reynolds Metals "Technical Advisor" No. 20, has a lead feature article devoted to stretch forming — one of the most advanced forming methods for aluminum. It is especially important for those applications where it is necessary to avoid "spring back" or change of shape after forming.

E. V. Sharpnack, Sr., Reynolds Chief Forming Engineer, details the process, the aluminum alloys and tempers suitable for use with it, forming blocks, lubricants, and the like.

The same issue of "Technical Advisor" also carries the second article in a series on "Finishes for Aluminum."

Also featured in this issue is the new method of welding aluminum without heat. This process (also called "cold" welding), produces true welds at room temperature by applying pressure in a certain manner. The process is explained and three typical welds in aluminum are shown, including spot welds in aluminum sheet, a lap weld in wire, and a butt weld in wire.

Any engineer or technical man may receive a copy of the current issue of the "Technical Advisor" and have his name placed on the mailing list to receive subsequent issues by writing to *Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky.*

♦ A new, completely revised edition of AVA's best-selling *Improving Instruction in Industrial Arts* was made available for use early in May. The book provides teachers, supervisors, administrators, teacher educators, and students of industrial arts with a dependable guide for use in promoting and improving the programs of industrial arts in the schools of the nation.

Contents of the new edition have been brought up to date, in keeping with the current philosophical trends of industrial arts thinking. New sections have been added on design in industrial arts, sources of publications and free instructional materials, and a bibliography. The instructional content areas have also been completely revised and enriched.

Copies of the publication may be obtained from the American Vocational Association, Inc., 1010 Vermont Ave. N.W., Washington 5, D. C., at $1.00 per copy (10 per cent discount for orders of ten or more).

♦ Epsilon Pi Tau, local Theta Chapter of The Stout Institute, Menomonie, Wis., initiated ten new members in spring initiation ceremonies.

The new EPT members are: Willis Capps, Gerald Duchon, Thornton Edgeberg, Robert Herling, Wilbert Knobeck, James Lund, Edward Nowicki, Dufur Peters, William Stern, and Robert Takasaki.

The initiation team consisted of Marvin Krueger, Phillip Mann, Howard Vetter, Robert Swanson, Jack Rupert, James Cook, and John Jarvis.

The initiation banquet was held at the Marion Hotel. Marvin Krueger, president of Theta Chapter, acted as toastmaster. Dr. John A. Jarvis, dean, division of industrial education at The Stout Institute, gave the welcome address to the new members. Dr. Thomas F. Fleming, assistant professor of English, gave the main address.

♦ A special course in plastics will open in September for selected seniors at the Machine and Metal Trades Vocational High School at New York City. The course will be offered in co-operation with the plastics industry.

The manufacture of raw materials, injection and extrusion molding, and fabrication of plastics will be covered in the course.

(Continued on page 45A)

POST

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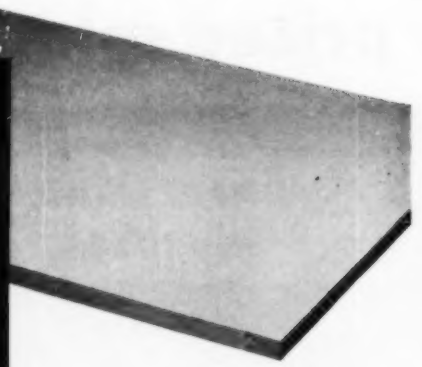

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NEWS NOTES

(Continued from page 40A)

Students to be trained in the special course have been assured jobs in the industry.

Equipment for the course is being donated by the industry through the Plastics Educational Commission of the Advisory Board for Vocational and Extension Education.

♦ On Tuesday, April 7, 1953, a bus load of Milwaukee industrial-arts teachers made a trip to Madison, to visit the Gisholt Machine Company in the morning, and the Forest Products Laboratory in the afternoon. This tour was very profitable to all those who made the trip.

♦ Electrical engineering and industrial engineering have been added to Illinois Institute of Technology's co-op program, the educational plan which integrates classroom study with practical experience in industry. Previously the program was offered only in mechanical and metallurgical engineering.

Expansion of the co-operative program represents an opportunity for students to obtain a real college education.

The co-op student attends I.I.T. his first semester and takes a regular schedule of courses leading toward his degree. His next semester he takes no classes, but is employed full time by an industrial firm.

During the semesters the student works, he not only receives valuable industrial experience but the company pays him a regular salary as well.

In some cases, the employing firm even pays the tuition. An example of this is the co-operative scholarship plan initiated this year by Armour Research Foundation, an affiliate of Illinois Tech.

♦ An industrial-arts course embracing woodworking, machine shop, and electricity, will be added to the curriculum in Bishop Ryan High School for Boys at Buffalo, N. Y. The school is run by the Franciscan Minor Conventual Fathers.

♦ "Aviation Education for the Entire Nation" was the theme under which the second national Aviation Education Workshop was launched July 23 at the University of Colorado, Boulder, Colo. Sponsored jointly by the university and Civil Air Patrol, the workshop was a fresh approach to the growing enthusiasm for general aviation courses in the country's schools.

Several hundred teachers representing nearly every state and territory turned out for the five weeks' summer course which was keyed to the nationwide observance of the fiftieth anniversary of powered flight, being celebrated all through 1953.

♦ A 28-minute, full-color documentary film, *The Bounty of the Forest,* has been released by the Western Pine Association for use by colleges, universities, high schools, and others for showing before interested groups.

This motion picture is available on loan free of charge — except for one-way postage — from the association's Portland office.

The film also pictures and describes the Western Pine Association research laboratory in Portland, Ore., where wood research is continuously carried on.

It is made on nonflammable safety stock, is of the sound-on-film type, and cannot be run on silent projectors. It is 16mm.

Black and white prints for television viewing are also available.

Requests for use of the film should be addressed to the *Western Pine Association, 510 Yeon Bldg., Portland 4, Ore.*

♦ Thirty-two science teachers from high schools in 19 states and the District of Columbia switched desks to become pupils in a special six-week course in chemistry, physics, and mathematics at Carnegie Institute of Technology.

The program was sponsored by the Westinghouse Educational Foundation which awards a science teacher fellowship of $250 to each of the 32 teachers selected by Carnegie Tech.

♦ The Rochester Institute of Technology has been authorized by the Board of Regents to extend its curriculum and to confer the degree of bachelor of science on qualified students. Students entering RIT this fall will be able to continue study toward the baccalaureate, according to President Mark Ellingson.

He emphasized that the addition of the bachelor's degree requirements to the curriculum does not mean a change in the program for the rating of Associate in Applied Science. The AAS is for students seeking two or three years of specialized higher education. The B.S. program will be an addition to the existing program.

♦ The following are the thirty judges who selected the winners in the 1953 Ford Motor Company Industrial Arts Awards competition.

Wrought-Metal Division

E. L. Barnhart, professor and head, industrial arts, Kansas State Teachers College, Emporia, Kans.

Roy A. Radtke, supervisor of industrial arts, Milwaukee Public Schools, Milwaukee, Wis.

(Continued on next page)

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NEWS NOTES

(Continued from previous page)

Dwight Fowler, industrial-arts teacher, Central Junior High School, Clarksburg, W. Va.

Patternmaking and Molding Division

E. D. Meyer, associate professor, Department of Industrial Arts, Oregon State College, Corvallis, Ore.

H. P. Gerber, professor and chairman, Division of Industrial and Fine Arts, Northern State Teachers College, Aberdeen, S. Dak.

Thomas Diamond, professor emeritus, University of Michigan, now chairman of the editorial board, *School Shop Magazine*.

Machine-Shop Division

Earl Bedell, divisional director of technical and trade schools, Detroit Public Schools, Detroit, Mich.

H. W. Widdowson, associate professor of industrial education, University of Minnesota, Minneapolis, Minn.

Waldo E. Hastings, industrial-arts teacher, Sparks High School, Sparks, Nev.

Wood Division

Otto Blitzner, master cabinetmaker; vice-president, General Exhibits and Displays, Inc., Chicago, Ill.

E. R. Glazener, professor and head, industrial education department, Arkansas Agricultural and Mechanical College, College Heights, Ark.

Claude E. Nihart, head supervisor, vocational and practical arts, Los Angeles City Board of Education, Los Angeles, Calif.

Plastics Division

Chris H. Groneman, head, department of industrial education, A. and M. College of Texas, College Station, Tex.

V. L. Pickens, head, division of practical arts, vocational and family life education, Public Schools, Kansas City, Mo.

Ralph W. Whalin, professor and head, industrial-arts department, Eastern Kentucky State College, Richmond, Ky.

Electrical Division

A. C. Moutoux, director of industrial-arts education, Evansville Public Schools, Evansville, Ind.

Philip W. Ruehl, assistant professor, industrial education, The Stout Institute, Menomonie, Wis.

H. N. Miller, state supervisor, Trade and Industrial Education, Olympia, Wash.

Mechanical-Drawing Division

George Bowers, engineering sales representative, Carborundum Corp., Louisville, Ky.

Maximillian Komow, director, industrial-arts education, New York City Board of Education, New York.

S. L. Coover, director, industrial-arts department, State Teachers College, California, Pa.

Architectural-Drawing Division

H. E. Duncan, architect, Victor Building, Kansas City, Mo.

L. L. Gore, head, industrial-arts department, George Peabody College for Teachers, Nashville, Tenn.

Joseph F. Morbito, registered architect, associate professor, industrial arts, Kent State University, Kent, Ohio.

Printing Division

James F. Hammond, director of industrial arts, State Teachers College, Fitchburg, Mass.

J. Osborne Johnson, supervisor of industrial-arts education, Public Schools, Denver, Colo.

Stanley C. Hlasta, author, printing consultant, general manager, E. W. Stephens Publishing Co., Columbia, Mo.

Leather, Models, Ceramics, and Open Divisions

H. J. Brennan, supervisor, School for American Craftsmen, Rochester Institute of Technology, Rochester, N. Y.

Kenneth W. Brown, assistant director, division fine and industrial arts, Public Schools, Philadelphia, Pa.

Walter Stein, president, Delaware Industrial Arts Association, Richardson Park, Del.

♦ *TV Manufacturers' Receiver Trouble Cures*, Volume I, is now available from *John F. Rider Publisher, Inc., 480 Canal St., New York, N. Y.*, and from the organization's distributors.

PERSONALITY TESTS FOR TEACHERS ARE UNDERTAKEN FOR BENEFIT OF CITY'S BOARD OF EXAMINERS

The New York City School system, through its Board of Examiners, is now studying the problem of teacher selection. A significant report on personality factors in the selection of teachers has been presented to Dr. William Jansen, superintendent of schools. The study was prepared by the teacher selection subcommittee of the Citizens Committee on Children and the research staff of the Bank Street College of Education.

The personality study was undertaken by the committee with the approval of the Board of Examiners. With the aid of a foundation grant, the committee prepared a "pilot study." Recent applicants for teaching licenses were put to an "extra" series of tests when they took their examinations. These were meant to determine, as far as possible, the attitude of the prospective teachers toward a number of subjects that might possibly affect their standing in the classroom.

The results of these first large-scale personality tests ever to be given in New York City are now being studied by the research committee. Out of the data the committee hopes will emerge a profile of each candidate that may prove valuable in determining whether the person likes children, will do well in the classroom, is emotionally stable, or has those qualities that make for good teaching.

The most important aspect of the subject is the follow-up of the pen-and-paper tests with classroom observations. Only those persons who have completed one term of teaching and who are beginning a second term in the same school will participate.

The final step of the study will consist of systematically studying the relation between the observational material and the assessment material. At some point it may be possible to evaluate objectively which of the theoretical questions are valid — that is, which methods can be taken as reliable indicators of how people will act. Out of it all, the committee hopes, will come a new type of examination that can be used by the Board of Examiners in selecting the best teachers for this city.

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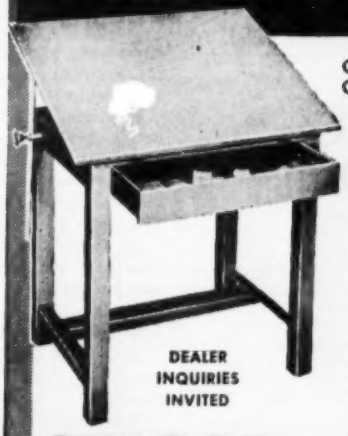

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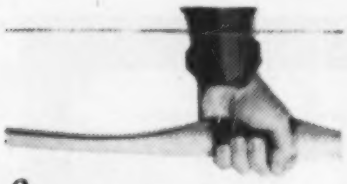

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New Publications

Machine Tool Operation — Part I

By Henry D. Burghardt and Aaron Axelrod. Cloth, 585 pp., 6 by 8¼ in., illus., $4.25. McGraw-Hill Book Co., Inc., New York 36, N. Y.

This is the fourth edition of this text which consists of two parts.

The first part has been revised and brought up to date, and presents what the machinist should know about safety, measuring tools, benchwork, the drill press, the lathe, and forge work.

The book is well illustrated with line etchings and half tones, and the appendix contains many useful tables and formulas.

Electronic Circuitry for Instruments and Equipment

By Milton H. Aronson. Cloth, 310 pp., 5½ by 8¼ in., illus., $4. Instruments Publishing Co., Pittsburgh 12, Pa.

A book aimed at giving technicians and engineers a thorough understanding of the subject of electronics, presents the subject matter in a nonmathematical style.

The book contains over 450 multiple-choice type questions (30 to 40 per chapter) so that it may be used either as a classroom text or for individual study.

Elements of Electricity

By William H. Timbie and Alexander Kusko. Cloth, 631 pp., 5⅝ by 8⅝ in., illus., $5.50. New York: John Wiley & Sons, Inc.; London, Chapman & Hall, Ltd.

This fourth edition of Timbie's well-known book has been thoroughly revised and brought up to date.

New methods and apparatus have been added so that its basic principles can be studied. Problems have been brought up to date, new illustrations have been used throughout the book, and many diagrams have been added.

The diagram contains many useful tables.

Carpentry for the Building Trades

By E. A. Lair. Cloth, 310 pp., 6⅛ by 9¼ in., illus., $3.60. McGraw-Hill Book Co., Inc., New York, N. Y.

This text, written by an instructor of the building trades, presents in clear and concise terms the principles underlying the various types of work which the carpenter has to do.

The author divides his book into ten chapters, in which he discusses framing; rafter framing; roofing and siding; lathing and plastering; finish trim, windows and doors; glazing and insulation; lumber grading and measuring; scaffold and safety measures; and blueprints and specifications.

As an aid to the instructor he has added a chapter in which he gives a long list of questions and problems, also a list of available visual aids.

The Pipefitters' Handbook

By Forrest R. Lindsey. Cloth, 282 pp., 4¼ by 6⅝ in., illus., $6. The Industrial Press, New York 13, N. Y.

A manual for the mechanic which will assist him to solve problems in pipe layout, and installation work which requires pipe bending or fitting around obstacles.

(Continued on page 50A)

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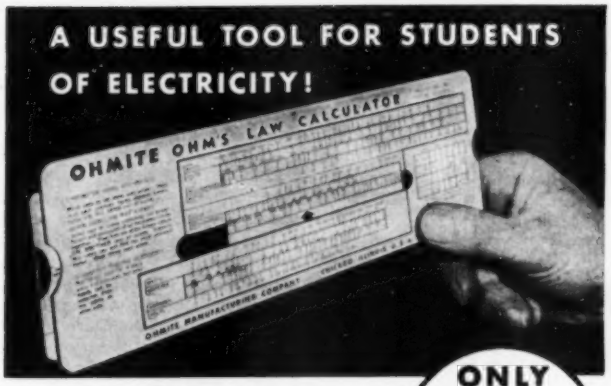

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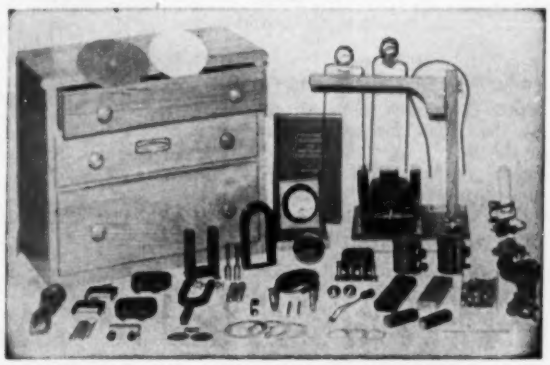

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NEW PUBLICATIONS

(Continued from page 48A)

The author has had over 35 years of practical experience and he embodies what he has learned in this book for the benefit of his co-workers in this field.

How to Build Your Own Garage

By Wayne C. Leckley. Cloth, 128 pp., 8¼ by 11¼ in., illus., $3.50. Popular Mechanics Press, Chicago 11, Ill.

This book presents explicit directions that will enable the amateur to build a garage to suit his budget.

It describes how to pour the concrete floor, erect the walls, locate windows and doors, put on the roof, and paint the garage. The directions given explain how to build the walls of wood, blocks, and bricks, and the builder is reminded that his garage can be made to include an A-bomb shelter.

The book is excellently illustrated, and presents 25 different designs from which the builder may choose.

Planning Your Future

By George E. Myers, Gladys M. Little, and Sarah A. Robinson. Cloth, 526 pp., 5⅞ by 8⅝ in., illus., $3.60. McGraw-Hill Book Co., Inc., New York 36, N. Y.

This is the fourth edition of this helpful text. The book is thoughtfully divided into six parts which help the student to study himself, give him an introduction to the world of work, present to him a picture of the groups of occupations, then aid him in studying the occupations of his own community, help him study the facts the worker should know, and assist him in finding his place.

Outboard Motors and Other Two-Cycle Engines

By Frank Venk, and edited by Irving Frazee, and Earl L. Bedell. Cloth, 159 pp., 5½ by 8½ in., illus., $3.95. American Technical Society, Chicago, Ill.

The author of this book is an instructor of automotives, aviation, and marine mechanics, and is well qualified to answer the questions which may trouble the users and owners of outboard motors, and other small 2-cycle gasoline engines.

The book describes the principles of the two-stroke cycle, the construction of the engine, the fuel system, repair and maintenance, trouble shooting, and the selection and operation of motors and boats.

Cabinetmaking and Millwork — Tools, Materials, Layout

By Alf A. Dahl and J. Douglas Wilson. Cloth, 235 pp., 5¾ by 8½ in., illus., $4.95. American Technical Society, Chicago, Ill.

This text clearly describes and illustrates what the cabinetmaker's work is; how the work can be safely done; the tools that the cabinetmaking mechanic uses; how blueprints are read; how lumber is measured and ordered; how rods are laid out; the steel square; geometrical shop layout jobs; and lumber and glues.

The book also discusses modular and standard construction, and cabinet hardware.

The appendix contains the standard abbreviations used by the trades.

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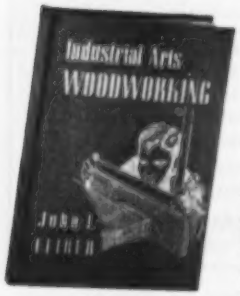

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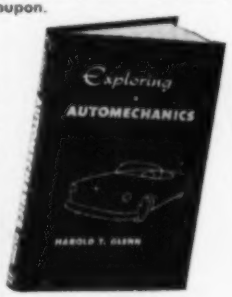

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(For Convenience Circle Index Code 0713)

(Continued on page 53A)

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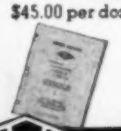

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SPECIALISTS IN ELECTRONIC SUPPLY FOR SCHOOLS

DESCRIPTIVE MATERIAL

(Continued from page 50A)

CATALOGUE ON WIDE VARIETY OF SURFACE GRINDERS

The DoAll Company's new line of precision surface grinders for toolroom and production-grinding operations is described in a new, well-illustrated 20-page catalogue. Among the models described is the company's D6 Tool Room Surface Grinder, now available with a considerably larger work area, and the D10 Model, a new large size having a 10 by 30-in. work area. Described also are DoAll's 3-in-1 coolant system, wherein "Cool Grinding" can be used alone or in conjunction with flood cooling, variable speed wheel dressing feed, slip rings on feed landwheels, etc.

Other new attachments for the grinders described in the catalogue include combination horizontal-vertical high-speed spindle, variable-speed spindle, crush-dressing spindle drive, motorized column raiser, and other items.

To obtain a free copy of this catalogue call your nearest *DoAll Sales-Service Store* or write *The DoAll Company, Des Plaines, Ill.*

(For Convenience Circle Index Code 0714)

CATALOGUE OF LIMA INDUSTRIAL MOTORS

The Lima Electric Motor Company has just completed a new brochure presenting the complete line of Lima Dripproof Induction Motors. The brochure includes Speed-Torque Curves, Frame Number Charts, Dimensions and Specifications for Lima Motors from 1/3 to 150 horsepower, as well as complete descriptions of variations for optional mounting and special purpose applications. This new bulletin also covers recent changes in design, including use of prelubricated sealed ball bearings throughout, which require no greasing or cleaning for normal life.

For your copy write to Mr. Richard R. Knierim, Sales Manager, *The Lima Electric Motor Co., Dept. 189, Lima, Ohio.*

(For Convenience Circle Index Code 0715)

NEW METALWORKING PROJECT BOOK

Have you obtained your free copy of the 32-page *Projects in Metalworking* booklet by Donald G. Lux, an instructor in industrial education at a leading midwestern university? The book contains 12 projects which may be used as is or they may be adapted to individual classroom requirements.

Typical projects are an outdoor lamp, jewelry box, name plate and hanger, pin-up lamp, and wastebasket.

Materials, procedures, and working drawings on each of the projects are described completely. Photographs show the finished projects and also describe operations that are performed with Di-Acro benders, brakes, and rollers.

Copies of the booklet in classroom lots are available at a special price of 25 cents each.

Write for your free copy, using school stationery, to *O'Neil-Irwin Mfg. Co., 544 Eighth Ave., Lake City, Minn.*

(For Convenience Circle Index Code 0716)

NEW FOREDOM CATALOG

Just off the press is the new Foredom Catalog fully illustrating their complete line of flexible-shaft machines, hand pieces, and accessories.

For your copy write to *Foredom Electric Company, Dept. 000, 27 Park Place, New York 7, N. Y.*

(For Convenience Circle Index Code 0717)

CATALOG ON FINISHES

Catalog-C Modern Furniture Finishes, for brush or spray was recently published by Gaston Finishes of Bloomington, Ind.

The catalog and price list covers complete finishing kits, pigment wiping stains, wood fillers, combination stain and filler, nongrain raising stains, lacquer type shading stain, glazing stains, varnishes, nonflammable remover, furniture polish and cleaner, rubbing compound, lacquer sealer and thinners, pigmented lacquers, crack fillers, etc.

Directions for using some of these products also are given.

For a copy of this catalog, write to *Gaston Finishes, Bloomington, Ind.*

(For Convenience Circle Index Code 0718)

NEW WHITMAN & BARNES CATALOG

Whitman and Barnes has recently issued a new general catalog, known as No. 105. This catalog has been designed for the convenience of tool supervisors, engineers, draftsmen, and buyers.

Visible indexes indicate each section. At the back is a complete alphabetical as well as a numerical index. All listings are complete as to types and sizes. A technical data section contains information that will prove helpful to all who are interested in cutting tools.

Standard packaging information is given

(Continued on page 60A)

For the finest lumber in your school shop, the name to remember is . . .

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By using PAXTON lumber you provide your school shop with utmost quality which means sturdy and attractive projects for your students. PAXTON lumber is properly graded and selected, reducing waste and spoilage. Write the yard nearest you for a free price and stock list of the complete PAXTON line and investigate the many reasons schools, just like yours, are using PAXTON lumber and materials.

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Fort Worth, Texas - - - - - - - - - - - - - - P.O. Box 1225
Kansas City, Missouri - - - - - - - 6311 St. John Avenue

SHOP EQUIPMENT NEWS

BLACK & DECKER ANNOUNCES NEW ELECTRIC JIG SAW

A portable electric jig saw that will do the work of a jig saw, saber saw, keyhole saw, plus most band-saw operations, has been announced by The Black & Decker Mfg. Company.

The Black & Decker Utility Jig Saw, which can be easily held and guided with one hand, is supplied with five different types of blades for cutting both hard and soft wood, plywood, ferrous and nonferrous metals, rubber, leather, plastics, composition boards, and insulating materials.

Portable Utility Jig Saw

Among the features of this new Black & Decker Utility tool is its ability to make pocket cuts in wood without a drilled entrance hole. It cuts in places often inaccessible to circular or hand saws. It makes straight, curved, or irregular cuts with equal ease.

The capacity of the jig saw is rated at ½ in. in softwood and ⅜ in. in hardwood, although if not used for continuous operation the maximum depth-of-cut in softwood is 1½ in., and 1 in. in hardwood. The B & D Utility Jig Saw is powered by a Black & Decker "universal" motor for use on 115-volt a.c. or d.c. current.

The net weight of this jig saw is 3½ lb. It has an over-all length of 8 in. and over-all height including blade of 7 1/16 in. Besides the five different blades, the tool comes equipped with toggle switch and three-conductor cable with plug.

For more information contact Thomas S. Hook, *The Black & Decker Mfg. Co., Towson 4, Md.*

(For Convenience Circle Index Code 0701)

NEW, DIRECT READING CHAMFER MICROMETER GAUGE

A new chamfer micrometer gauge has recently been introduced by Acme Industrial Company. The new instrument is designed to accurately read directly end diameters of chamfers up to 1-in. from 0 deg. chamfer to 90 deg. included angle maximum chamfer. The depth of chamfer in a hole is also easily computed. This new chamfer gauge is a direct reading micrometer and can be read like any standard micrometer. This instrument provides substantial savings in time over other methods of computing the end diameter and depth of a chamfer. A master check bar with a known indicated end diameter and chamfer is furnished with each chamfer gauge for checking the calibrations of the micrometer.

Direct Reading Chamfer Gauge

Further information and instructions for use may be obtained by writing to the *Acme Industrial Company, 200 North Laflin Street, Chicago 7, Ill.*

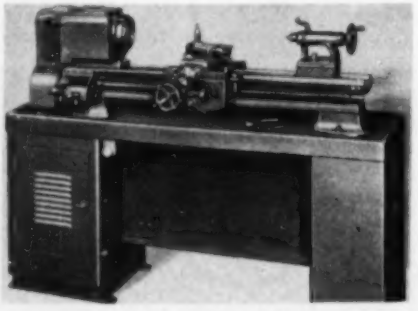
(For Convenience Circle Index Code 0702)

NEW 12-IN. LOGAN LATHE

Logan Engineering Company announces that their new 12-in. lathe is now in production. A heavy headstock; double V-belt outboard drive; massively proportioned, ball bearing mounted spindle; and a convenient, precision-built carriage are the new lathe's most important features.

Indicative of its capacity are such specifications as the 12-in. swing-over bed and saddle wings, 1-in. collet capacity, 1⅛-in. spindle hole, and center distances of 23 and 35 in.

On heavy cuts its double V-belt drive, massive headstock, and extra heavy spindle combine to provide smooth power and rigidity. Mounted on double rows of oversize, wide-spaced ball bearings at each end of the headstock, the spindle provides sustained accuracy through 16 speeds, from 38 to 1260 r.p.m.



12-in. Logan Lathe

Information on both screw cutting and turret models is available from *Logan Engineering Company, Lawrence and Lamon Aves., Chicago 30, Ill.*

(For Convenience Circle Index Code 0703)

LINEAR AND OPTICAL STANDARDS CHECKS ALL ASPECTS OF MICROMETER ACCURACY

A "micrometer checking set" designed for checking 1- and 2-in. micrometers has been added to the DoAll Company's extensive line of gauge blocks, gauges and gauging accessories. The set includes three gauge blocks, .2500, .6500, and 1.000 in. respectively. These are used individually or in combination for checking the accuracy of the micrometer screw at various points in its travel. Evidence of wear in the micrometer screw can be discovered with such checks.

Checking Calibration of a Micrometer With a Gauge Block

Two optical parallels of fused quartz, which are part of the set, provide an accurate and simple method for checking the condition of the micrometer spindle and anvil faces. In making such checks, a parallel is held between the gauging surfaces of the micrometer like any ordinary part. Then under a monochromatic light, such as the DoAll Monolight, the fringe lines appearing on the micrometer gauging surfaces may be read to determine deviation from flatness, parallelism, or squareness of the spindle faces to the spindle axis. The optical parallels are of different sizes — one is .500 in. thick and the other is .0125 in. thicker. These two different sizes permit optical checks to be made of the spindle at two points in its rotation, ½ a turn or 180 deg. apart.

Optical parallels may be purchased separately if so desired.

For additional information regarding the micrometer checking set call your nearest DoAll Sales-Service Store or write *The DoAll Company, Des Plaines, Ill.*

(For Convenience Circle Index Code 0704)

help make their *HANDS MORE CREATIVE* with x-acto Knives and Tools

X-acto precision knives and tools help give your students' hands more creative "follow-thru."
Because there's a specific designed-for-the-job X-acto for many different school handicraft, art and shop needs . . . to help them do a better job—with their own hands.
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HAND SAW TEETH SET IN 32 SECONDS

Both rows of teeth — both sides of saw — are given a perfect, uniform set in one speedy run through the new Foley Automatic Power Setter.

Precision Foley Saw Setter

A 26-in. 8-point hand saw is set in 32 seconds. This speed and precision results from the exclusive Foley *twin-hammer* action, powered by a single spring.

Only three easy adjustments are needed for automatic operation — insert saw, select points per inch (from 4 to 16), adjust depth of set.

No special skill is needed for accurate operation and there is no eyestrain.

Long life is assured by hardened steel anvils and hammers, precision bushings, and lifetime lubricated ball bearings where needed. Equipped with motor and *step-on* foot switch.

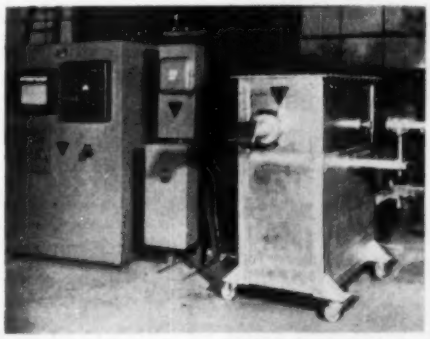
For complete information, write to *Foley Mfg. Co., 3318 N.E. 5th St., Minneapolis 18, Minn.*

(For Convenience Circle Index Code 0705)

NEW 5000-DEG. CARBON RESISTOR-TYPE TUBE FURNACE

The new Pereco Model CT-312 for ultra-high temperature work in the formation, fabrication, or processing of ceramic materials or refractory materials has recently been announced by the Pereny Equipment Company, Columbus, Ohio.

The Model CT-312 is capable of rapid warm-up to 5000 deg. F., reaching that temperature in approximately two hours.



5000-Deg. Carbon Resistor Type Tube Furnace

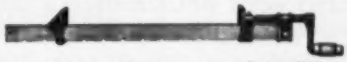
Elements are water cooled and completely protected with fail-safe electrical interlocks. The entire furnace is automatically shut down in the event of water-flow failure to either or both the transformer or electrodes.

(Continued on next page)

SPECIFY AND INSIST UPON GENUINE "Jorgensen" TRADE MARK REG U S PAT OFF

STEEL BAR CLAMPS

"JORGENSEN" Steel Bar Clamps offer many exclusive desirable features. The "multiple disc clutch" holds securely, releases easily without notches or other deformity in the bar. Fast operating and economical — repairs easily made if ever necessary. Built to industrial standards, they will serve you best in the school shop. Style #70 "JORGENSEN" I-bar Clamps are a favorite — many other Styles are available.



Still a favorite with some users, Style #61 is a "notched bar" type steel bar clamp. Somewhat slower in operation than our "fast-operating" bar clamps, but just as carefully designed. Will provide long, satisfactory service.

"JORGENSEN" Handscrews are regarded as the "standard" everywhere for school-shop and industrial service. Jaws are carefully selected, properly seasoned hard maple, made in our own factory; cold-drawn steel spindles; hard maple handles will not come loose. Look for the trade-mark "JORGENSEN" on every jaw.

"Jorgensen" TRADE MARK REG U S PAT OFF AND "Pony" REG U S PAT OFF

Steel Bar Clamps, "C" Clamps, Handscrews, Clamp Fixtures, Press Screws, Lathe Dogs, etc., are available thru your favorite tool supplier — cost no more than ordinary clamps!

CATALOG SENT FREE UPON REQUEST

ADJUSTABLE CLAMP COMPANY
"The Clamp Folks"
424 No. Ashland Ave. Chicago 22, Ill.

THE Hotpack ELECTRIC PLASTIHEETER

No. 15

Designed for Use in Plastic Courses in the School

The HOTPACK PLASTIHEETER is a commercial type strip heater designed to heat sheets of Plexiglass or Lucite until they become soft and pliable for shaping to the form desired. It is essentially used for straight line bends or folds and is capable of heating sheet material up to ⅛" thickness in from 30 seconds to 4 minutes depending on the thickness of the material. As the material does not come into contact with the heating element and the platen remains cool, there is no possibility of creating mark-off on the sheet.

SPECIFICATIONS

Model No.	Working Space	Overall Size
15	18"Lx5"Wx2½"H	21"Lx7"Wx3½"H
16	30"Lx5"Wx2½"H	32"Lx7"Wx3½"H

	Wattage 115 Volt	Shipping Weight	Price F.O.B. Phila.
15	200 W	4 lbs.	$15.00
16	350 W	6 lbs.	$25.00

THE ELECTRIC Hotpack COMPANY, INC.
5067 Cottman St., Philadelphia 35, Pa.

Teach Modern Wood Finishing with the famous SEALACELL PROCESS

The Wipe-on" Finish that
- Eliminates dust troubles
- Requires no brushes
- Protects and preserves wood
- Needs no sanding between coats

SPECIAL OFFER
Our new pocket size Sealacell Penetrating Process Wood Finishing Manual is free on request. Additional student copies sent free with your order of materials.

GENERAL FINISHES SALES and SERVICE CO.
1548 West Bruce St. Milwaukee 46, Wis.

SHOP EQUIPMENT NEWS

(Continued from previous page)

The new furnace may be equipped with either Ignitron-Thyratron type (440/60/1) or Saturable Reactor capable of supplying power continuously variable from 1 to 100 per cent of connected load.

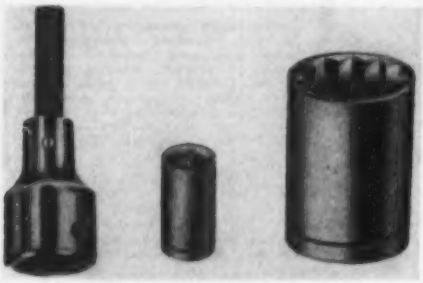
The all-welded steel furnace is 23 in. wide, 60 in. high, and 41 in. long, plus external fixtures.

For further information, write to *Pereny Equipment Co., Columbus, Ohio.*

(For Convenience Circle Index Code 0706)

PROTO ADDS HOLLOW-HEAD SCREW AND METRIC-SIZE SOCKET WRENCHES

Two more types of socket wrenches — hollow-head screw and metric-size — have been added to the Proto line.



Proto Hollow Head Socket Wrench and Metric-Size Sockets

Ten ¾-in. drive sockets are available, ranging in hexagon bit size from 1/16 to 3/8 in., and accommodating Allen-type screws from ¼ to ¾ in. Three sockets have extra long bits for special jobs. Each bit is held securely by a slotted-head setscrew, which permits easy removal of a bit that may become worn after long use. The part of the socket that holds the bit is tapered to increase clearance.

The metric line includes nine ¼-in. drive sockets with openings from 4 to 12 millimeters, and twenty ½-in. drive sockets with openings from 12 to 30 millimeters.

All of the new sockets are made of special alloy steel and chrome-plated.

For further information, write to the *Plomb Tool Co., Los Angeles, Calif.*

(For Convenience Circle Index Code 0707)

NEW TEACHING PROJECT FOR AIRCRAFT — SHEET-METAL WORK

Aircraft-construction training programs can now be taught effectively in the average school shop. The Schweizer Aircraft Corporation of Elmira, N. Y., is developing a series of *training kits* designed to teach these techniques and aluminum sheet-metal work. Students gain not only effective training but the end product of the project is useful.

The first of the series is the Schweizer Utility Case Project No. 1. The basic kit includes all the materials for making a utility case with ends preformed to shape, necessary hardware, blueprint, and student procedure instructions. This practical case can be used as a tool kit, tackle box, or picnic box.

Complete Schweizer Utility Case Project

The project has been developed to provide a practical project using modern aircraft materials of aluminum and plastic. Most of the work on the project can be done with ordinary shop tools.

For further information, write to *Schweizer Aircraft Corp., Elmira 1, N. Y.*

(For Convenience Circle Index Code 0708)

(Continued on page 58A)

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Need lumber for Fall term?

From our large inventory of thoroughly kiln-dried "ready-to-ship" lumber, we are in a position to fill rush orders.

Where possible, shipments are made by truck transports. This dependable means of mill-to-school service assures safe, clean, and quick delivery.

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It gives full details and lowest school prices on everything you need. Quick delivery to any part of the country on such items as:

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- — and Others

Wonderful New Shop Project — Build SPORTS CAR BODIES and Boats of Fabulous Fiberglas-Polyester Plastic

Create new interest . . . a wave of excitement among your students by adding these, and many more unusual projects, to your plastics course. New wonder material is easy to work with, strong, practical. Write for complete instructions today!

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In addition to the Price List that's packed with data you'll find useful when ordering, you also get our Jewelry Findings Catalog and Information on Fabrication of Plastics to round out your buying guides for all plastic craft needs. Don't delay — write today!

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Illustrates 32 rare and fancy woods, 54 multi-colored bandings, 40 inlays and overlays--in color. Also--31 embossed mouldings, 24 carved ornaments, 275 scroll patterns. And--51 pages of all kinds of tools and supplies plus pages of ideas, instructions, information. Save money, save time--send for your free copy NOW.

QUICK DELIVERY
One board or a carload
Maple, poplar, oak, mahogany, cherry, walnut, red cedar and many others--all properly seasoned and kiln dried and all correctly graded.

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2727 SOUTH MARY STREET Dept. F. 9
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- ***FOR EXTRA INCOME***

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AT last--here's a new and different illustrated booklet that will show you...step by step...how to make stunning, popular fiber glass lampshades in your own home. And you can make them easily and quickly for only a small fraction of regular store prices.

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Simply follow five easy steps. No tools or experience required. Twelve gorgeous lampshades to choose from. Each in kits, including everything you need--shade rings; fiber glass material in four decorator colors... red, white, green, chartreuse...plain or doodled; harmonizing lacing. For fun or profit--mail the coupon and only 25c right now.

So Easy!...No experience necessary

- *Just five simple, easy steps to follow*
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Benefit from over 50 years of Craft experience. We will send you A LIST OF MATERIALS REQUIRED FOR YOUR PROGRAM OF:

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Complete coupon below giving craft and number of students per class.

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FREE CATALOG

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Then wipe them clean with a soft, absorbent GREASE CHAMP WIPING CLOTH. Every Cloth Features:

- *Low Cost* . . . 17¢ a pound, containing 8-10 large pieces.
- *Light Weight* . . . heavier than a cheesecloth but lighter than a lace curtain.
- *Absorbent* . . . absorbs its own weight in grease several times.
- *Uniformly Good* . . . consists only of a 100% cotton fabric.

GREASE CHAMP IS GUARANTEED. Order a trial 100 lb. bale today. Price is f.o.b. Holyoke, Mass.

SAFEGUARD COMPANY, INC.

DEPT. B, BOX 744 HOLYOKE, MASS.

TOOLS ALWAYS SHARP WITH PLURALITY OILSTONE TOOL GRINDERS

NOW AVAILABLE IN 3 SIZES
No. 425 Plurality Sub Jr.
No. 450 Plurality Jr.
No. 475 Plurality

Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

MUMMERT-DIXON CO.

HANOVER, PENNSYLVANIA

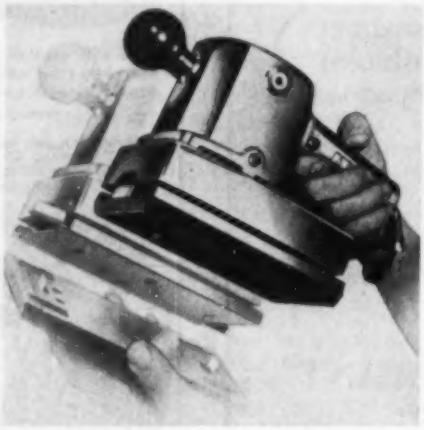
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

SHOP EQUIPMENT NEWS

(Continued from page 56A)

NEW MOTOR-DRIVEN SANDER FEATURES STRAIGHT-LINE ACTION

A rotary motor driven sander with *Straight-Line Reciprocating Action* and the power to do a professional finishing job has been placed into production by the Dremel Manufacturing Company. This sander will not gouge, leave lap marks, cut orbital swirls, or other hard to cover abrasive patterns.



Straight-Line Action Motor Sander

The sander also features a very unique paper holder assembly that detaches from the machine at the flick of a finger. An extra paper holder unit is furnished so that grits can be switched quickly without bothersome paper change. This sander is designed for rugged duty, in industry, on construction work, and all around home, school, and shop use.

Because it sands *with the wood grain* the Dremel "53" sander is guaranteed to produce smooth, scratch-free finishes. Compact in construction, it weighs approximately 5¼ lb., uses standard-size 3⅔ by 9-in. abrasive sheets. It has a polished aluminum housing, lifetime sealed ball bearings, and is driven by a powerful 110–120 volt, 60 cycle a.c. rotary motor.

For further information, write to *Dremel Mfg. Co., Racine, Wis.*

(For Convenience Circle Index Code 0709)

ADDITION TO FRANKLIN GOTHIC TYPE FAMILY

A new addition to American Type Founders' Franklin Gothic faces has just been made. This new face makes the family of Franklin Gothic types more versatile than ever. It is also compatible with a score of body types that have become old favorites.

Franklin Gothic Wide is available in nine sizes, from 14 pt. to 72 pt. Sizes 6, 8, 10, and 12 are in preparation.

Specimen sheets may be had from Frank Gerhart, Advertising and Sales Promotion Manager, *American Type Founders, Inc., 200 Elmora Ave., Elizabeth 8, N. J.*

(For Convenience Circle Index Code 0710)

(Continued on page 60A)

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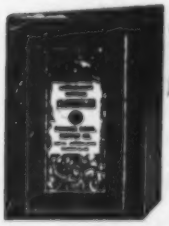
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SHOP EQUIPMENT NEWS

(Continued from page 58A)

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(For Convenience Circle Index Code 0712)

(See page 50A for listing of new catalogs under "Descriptive Material")

DESCRIPTIVE MATERIAL

(Continued from page 53A)

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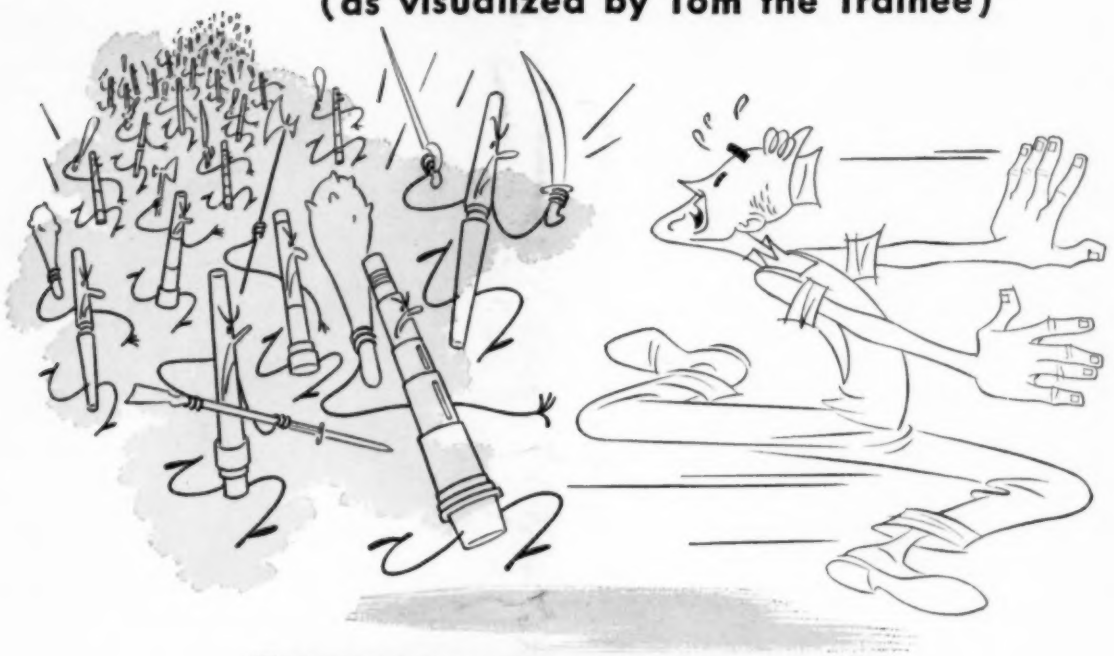

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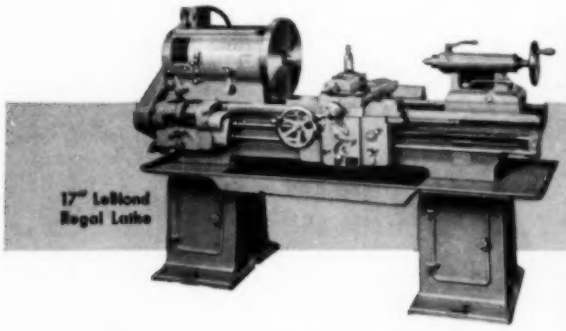

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